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Marine Fisheries Abstracts

U.S. DEPARTMENT OF COMMERCE
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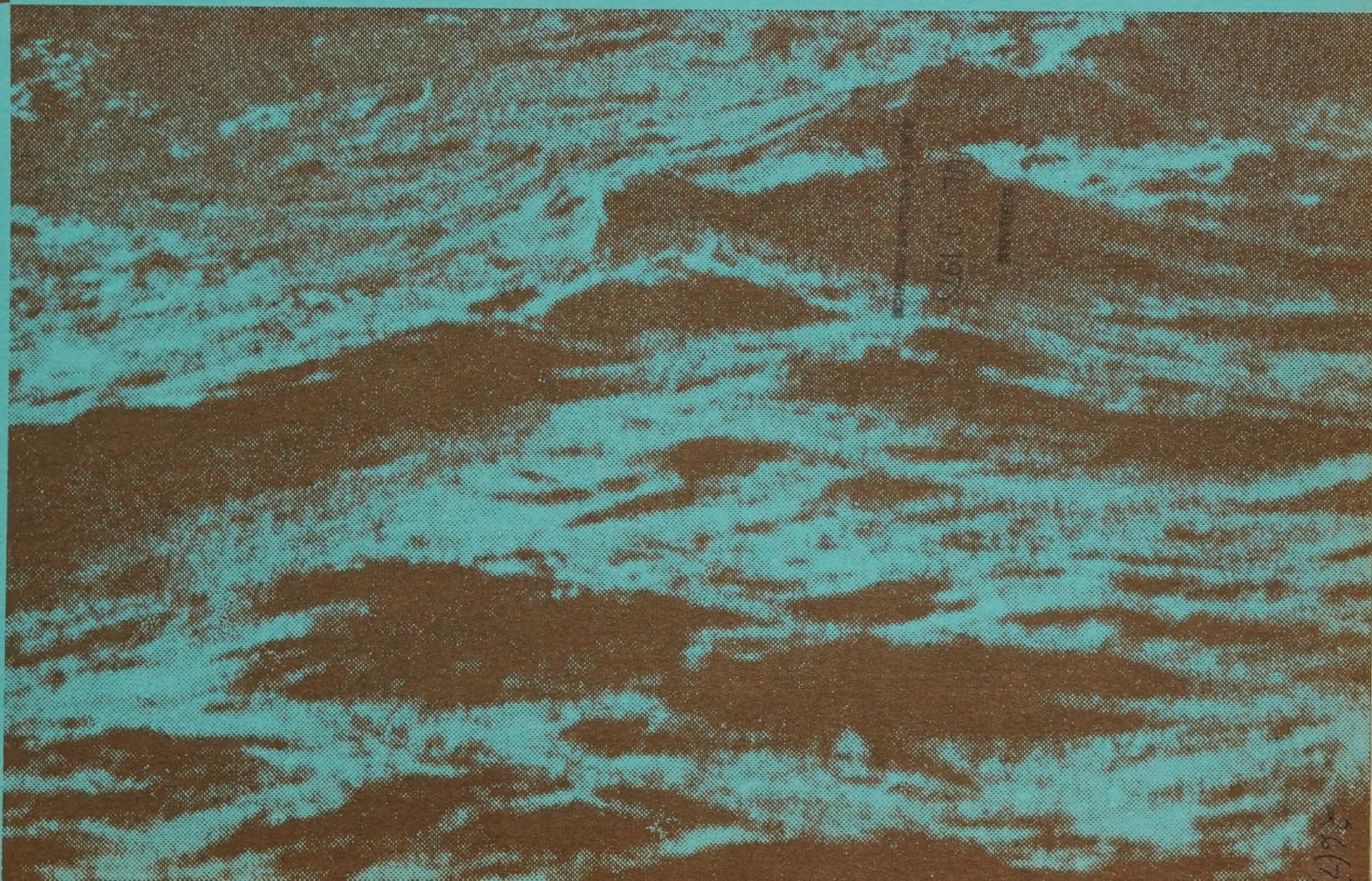
National Marine Fisheries Service



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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Marine Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Marine Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

For sale by the Superintendent of Documents, U.S. Government Printing Office Washington, D.C. 20402 - Subscription price: $6.50 per year, ($1.75 additional for foreign mailing). Single copy 65 cents.

0.33 INHIBITION OF LECTINS BY ANTIFREEZE GLYCOPROTEINS FROM AN ANTARCTIC FISH

Chuba, Joseph V., and William J. Kuhns (Immunohematology Laboratory, Dept. of Pathology, New York University School of Medicine, New York, NY 10016), Ross F. Nigrelli, Jackie R. Vandenheede, David T. Osuga, and Robert E. Feeney
Nature 242, No. 5396, 342-343 (Mar. 30, 1973)

[A lectin is a substance that is not an antibody yet combines specifically with an antigen and produces phenomena resembling immunological reactions such as agglutination of red-blood cells. Lectins have been isolated from plants. Abstractor's note]

Reports of other workers indicated that certain Antarctic fish can resist freezing at ambient water temperatures of -1.9° C. This resistance to freezing is partly attributed to the presence in the serum of a group of "antifreeze" glycoproteins, which are composed of repeating units of the triglycopeptide, Ala-Ala-Thr-O-disaccharide. The disaccharide was identified by other workers as galactosyl-N-acetylgalactosamine. Three antifreeze active glycoproteins were isolated from blood serum of the fish Trematomus borchgrevinki and found to differ from each other only in polymer length. Two related glycoproteins were found that differ from the others in relative antifreeze activity. In attempts to study these glycoproteins, immunological techniques were applied, using horse antipneumococcal sera, with unsatisfactory results. Tests were then performed on the ability of the glycoproteins to inhibit plant lectin induced hemagglutination of various red-blood cells (human, Rhesus, sheep, and chicken). The results show that glycoproteins which were active in the antifreeze effect in fish serum were also active in

0.34 A PISCICIDAL CONSTITUENT OF SAPIUM JAPONICUM

Ohigashi, Hajime, Kazuyoshi Kawazu, Koichi Koshimizu, and Tetsuo Mitsui (Dept. of Food Science and Technology, Kyoto University, Kyoto and Dept. of Agricultural Chemistry, Okayama University, Okayama, Japan)
Agricultural and Biological Chemistry 36, No. 13, 2529-2537 (Dec. 1972)

A piscicidal constituent $C_{32}H_{42}O_8$ was isolated from S. japonicum, a tall deciduous tree commonly growing at the foot of mountains in Japan. Its formula is 12-O-n-deca-2,4,6-trienoyl-phorbol-(13)-acetate.

The piscicidal activity of the isolate and its derivatives were tested against killie-fish. The piscicidal activity of rotenone, callicarpone, huratoxin, and pentachlorophenoxide was compared to the isolate in a similar manner. The results showed that the isolate was four times as toxic as rotenone, and the toxicity was comparable to huratoxin which contains a diterpene part similar to the isolate. The monoacetate and hexahydro derivatives of the isolate were equally toxic. [3 figures, 3 tables, 11 references] FTP

0.35 A REVIEW OF THE STUDIES ON THE SOLUBILITIES OF THE MUSCLE PROTEIN FRACTIONS

Ahmad, Hamid (Pakistan Council of Scientific and Industrial Research Laboratories, Lahore 16, Pakistan)
Science and Industry 9, Nos. 1-2, 9-19 (Jan.-Apr. 1972) (Published by the Pakistan Council of Scientific and Industrial Research, 39 Garden Road, Karachi 3, Pakistan)

Skeletal muscle constitutes the main part of the meat we eat and contributes more than 50% of the weight of an animal. Muscle proteins can be classified into three fractions based upon their solubilities. Those proteins soluble in water or dilute salt solution are called the sarcoplasmic proteins; those soluble only in concentrated salt solutions are called myofibrillar proteins; and those not soluble in water or concentrated salt solutions are the connective tissue and similar structures. The protein nitrogen distribution in the muscle runs about 36% in the sarcoplasmic protein, 58% in the myofibrillar protein, and 6% in the connective tissue protein. The sarcoplasmic proteins, consisting of myogens and globulins, are dissolved in the sarcoplasma of the muscle cell and constitute a complex mixture of some 50 components. Myofibrillar proteins are in the contractile apparatus of the muscle, and their major components are myosin, actin, and tropomyosin. The connective tissue proteins components include collagen, reticulin, and elastin.

This paper is a review of the literature dealing with the solubilities of the sarcoplasmic and myofibrillar protein fractions of muscle tissue. It contains

0.35 (7.67) EFFECT OF DIETARY VITAMIN E ON THE ACTIVITIES OF THE GLUTATHIONE PEROXIDASE SYSTEM IN RAT TISSUES

Chow, C. K., K. Reddy, A. L. Tappel (Dept. of Food Science and Technology, University of California, Davis, CA 95616)
Journal of Nutrition 103, No. 4, 618-624 (Apr. 1973)

Lipid peroxides are highly toxic and methods for their detoxification have focussed on α-tocopherol as an inhibitor of peroxidation. The effect of dietary α-tocopherol on activities of enzymes important in protection against lipid peroxidation was studied in tissues of rats. The activities of glutathione (GSH) peroxidase, GSH reductase and glucose-6-phosphate (G-6-P) dehydrogenase were significantly increased in perirenal adipose (PRA), paraepididymal adipose (PEA) and muscle, but not in liver, lung and kidney of animals fed a 15.7% tocopherol-stripped corn oil diet. The activities of GSH reductase and G-6-P dehydrogenase, but not GSH peroxidase, were also significantly increased in testes of rats fed the corn oil diets. Accumulation of fluorescent products (FP) in PEA and PRA of these animals was also increased. There are close linear relationships among these measurements. The increases in activities of the GSH peroxidase system in PEA, PRA, muscle and testes of rats fed the corn oil diets appear to be in response to the lipid peroxidation which occurred in these tissues. Except for muscle and testes, similar increases in the activities of GSH peroxidase and GSH reductase were found in tissues of rats fed a diet that contained 15.7% cod-liver oil.

Authors' abstract

0.35 (0.36) WAX ESTERS IN FISH: ABSORPTION AND METABOLISM OF OLEYL ALCOHOL IN THE GOURAMI (TRICHOGASTER COSBY)

Sand, D. M., C. H. Rahn, and H. Schlenk (Hormel Institute, University of Minnesota, Austin, MN 55912)
Journal of Nutrition 103, No. 4, 600-607 (Apr. 1973)

Absorption and subsequent metabolism of oleyl alcohol and oleic acid in the female gourami (Trichogaster cosby) were compared by feeding the 1-$^{3}H_2$- or U-^{14}C-labeled compounds. Lipids of intestines, blood, liver, body and roe were analyzed at time intervals over a period of 24 hours after ingestion. Absorption of both alcohol and acid was 60 to 70% of the amount offered. Alcohol was largely oxidized to acid in the intestinal tissue, but some of it was esterified to form wax ester. The relative extent to which these processes took place depended on the amount of alcohol fed. Dietary acid did not give rise to alcohol or wax esters in the intestines. Free alcohol did not enter the blood stream in any appreciable amount, but wax esters were found in the blood lipids. Some of these wax esters were deposited with body and roe lipids. Liver lipids, however, contained free alcohol besides wax ester which indicates that they are subject there to further metabolism probably involving oxidation of the alcohol moiety. The liver seems to have mainly a corrective function when the digestive and circulatory systems are overloaded with wax esters. Body wax esters are < 1% of the total body lipids in the gourami and intestinal wax esters are a major source for them. Roe wax esters are 85% of the roe lipids, but only a minor part of them orginates from intestinal wax esters. The greater portion of roe wax esters is synthesized in the roe where the chains of the dietary oleyl alcohol or oleic acid are used equally efficiently in spite of the intermediary oxidation of the former. Authors' abstract

0.35 IN VIVO INCORPORATION OF ^{3}H ARACHIDONIC ACID AND ^{14}C LINOLEIC ACID INTO LIVER LIPIDS FROM ESSENTIAL FATTY ACID-DEFICIENT RATS

Mercuri, Osvaldo, and Maria Elena De Tomás (Catedra de Bioquimica Instituto de Fisiölogia, Facultad de Ciencias Médicas, U.N.L.P., Calle 60 y 120, La Plata, Argentina)
Lipids 8, No. 3, 156-158 (Mar. 1973)

In earlier work on the in vivo incorporation of ^{14}C-linoleic acid into the liver lipids of essential fatty acid (EFA)-deficient rats, the authors found that the ^{14}C-linoleic acid is directed predominantly to the phospholipid fractions. Because arachidonic acid is considered the principal EFA, the authors examined, in the present study, the simultaneous incorporation of this acid and its precursor, linoleic acid, into the liver lipid of EFA-deficient rats. EFA-deficient rats were injected into the portal vein with a labeled solution containing ^{3}H arachidonic acid and ^{14}C-linoleic acid during a 1-min. period. The livers were then frozen and pulverized, and the lipids were extracted and fractionated by thin-layer chromatography. The amount of ^{3}H and ^{14}C incorporated into the liver lipids was measured, and the percent distribution of the radioactivity into the different lipid fractions was determined and compared with similar data obtained from normal rats. It was found that there was a statistically significant increase in the amounts of ^{3}H-arachidonic acid and ^{14}C-linoleic acid incorporated into the phospholipid fraction of the liver lipid from EFA-deficient rats over the amounts of these acids incorporated into the phospholipids of that of normal rats. The authors suggest that the reason for this increase could be a more active deacylation-reacylation cycle in EFA-deficiency.
[1 table, 19 references] FTP

0.33

inhibiting hemagglutination of the erythrocytes by lectins from two sources: Osage orange and castor bean. Those glycoproteins which were not active in antifreeze effect were markedly less active in hemagglutination inhibition. In comparative studies of inhibition using monosaccharides, these sugars inhibited Osage orange lectin hemaglutination in the following order of decreasing activity: N-acetyl-galactosamine, D-galactose, 2-deoxy-D-galactose, and alpha-methyl-D-mannoside. Activity of these sugars and the inactivity of 6-deoxy-D-galactose (which was also tested) indicates the likely participation in Osage orange lectin interactions of hydroxyl groups at the 3,4, and 6 carbon positions of the terminal D-galactosyl residues of the active glycoproteins. The activity of the glycoproteins for inhibiting the lectin and their activity for depressing the freezing point in fish seem to depend on regular spacings of the disaccharides along the peptide chain of the glycoprotein structure. The authors suggest that the lectin assay provides a micro method for determining the amounts of glycoprotein in tissues and fluids of polar fish.
[1 table, 16 references] SW

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two tables that summarize the methods used for extracting the proteins from muscle. The first table deals with the extraction of sarcoplasmic proteins and the second with myofibrillar proteins; both list buffer systems used, pH of extracting solution, temperature of extraction, time of extraction, and the literature reference source.
[2 tables, 44 references] FTP

0.33 KINETICS OF SYNTHESIS OF PROTEIN MEMBRANES GAS VACUOLES OF MICROCYSTIS AERUGINOSA (BLUE-GREEN ALGA)

Lehmann, Heiner (Bot. Inst., Tierarztl. Hochsch., Hanover-Kirchrode, Germany)
Chemical Abstracts 77, No. 17, 111731y (Oct. 23, 1972)

0.35 FREE FATTY ACID METABOLISM DURING STRESS: EXERCISE, ACUTE COLD EXPOSURE, AND ANAPHYLACTIC SHOCK

Paul, Pavle, and William L. Holmes (Division of Research, Lankenau Hospital, Philadelphia, PA 19151)
Lipids 8, No. 3, 142-150 (Mar. 1973)

Tissues, particularly the muscle, can take up and oxidize free fatty acid (FFA) and, also, the FFA has a rapid turnover rate; thus, glucose and FFA play an important role in energy metabolism. Glucose and FFA are metabolized from energy depots in the body and delivered to their sites of utilization via the circulatory system. In earlier work, the senior author found that animals exercising at different work loads but at equivalent plasma FFA concentrations have an increased rate of FFA turnover and percentage of FFA uptake immediately oxidized at the higher workloads. Apparently, metabolic rate is also one of the factors to be considered when evaluating FFA metabolism. Plasma FFA is the most important energy yielding substrate for most animal tissues, and its mobilization is under sensitive hormonal control. In the present study examination was made of FFA metabolism under different metabolic conditions of physiologic stress of exercise or acute cold exposure and on the pathologic stress of anaphylactic shock. These data were compared with those obtained in normal animals surgically deprived of their pancreas or thyroid or infused with lactic acid, norepinephrine, or nicotinic acid (agents which affect lipid metabolism). The rates of turnover and oxidation of plasma FFA were determined in unanesthetized dogs with the aid of a technique involving continuous infusion of albumin-bound palmitate-1-^{14}C and the simultaneous measurement of O_2 uptake, CO_2 output, and specific activities of CO_2 and FFA.

0.36 (9.19) THE ABSORPTION AND METABOLISM OF ARSENIC IN FISH

Lunde, Gulbrand (Central Institute for Industrial Research, Blindern, Oslo, Norway)
Fiskeridirektoratets Skrifter Serie Teknologiske Undersøkelser (Reports on Technological Research concerning Norwegian Fish Industry) 5, No. 12, Directorate of Fisheries, Bergen, Norway (1972), 16 pp.

In earlier work, the author showed that fish contain arsenic compounds in the form of lipid soluble and of water-soluble arseno organic compounds. Certain single-celled algae are able to synthesize lipid soluble and water-soluble arseno organic compounds. It is possible that these organisms might be the source of the arseno organic compounds in the marine food chain (in fish, shrimp, and other invertebrates). However, if arsenic occurs in compounds that are essential to fish, it is possible that fish are able to synthesize these compounds. Such information would be useful from a biological point of view and in connection with arsenic containing pollution and waste. In the present study, the author examined the absorption and metabolism of inorganic arsenic in rainbow trout by use of radioactive tracers. In one series, the arsenic was mixed with the feed of the trout, and in another series the arsenic was added to the water.

Fish will absorb inorganic arsenic when it is mixed into the feed, and will synthesize lipid soluble and water-soluble arseno organic compounds. The absorption of inorganic arsenic seems to depend upon the quantity of arsenic present in the fish; the absorption decreases as the concentration of arsenic in the fish increases. When radioactive arsenic (As-74) is added to the water, absorption

0.38 (1.88) GENETIC VARIATION IN A GRADIENT OF ENVIRONMENTAL VARIABILITY: MARINE BIVALVIA (MOLLUSCA)

Levinton, Jeffrey (Dept. of Earth and Space Sciences, State University of New York, Stony Brook, NY 11790)
Science 180, No. 4081, 75-76 (Apr. 6, 1973)

A belief held by selectionists (those who consider natural selection a fundamental factor in evolution) is that varying and heterogeneous environments (such as a habitat with a wide range in depth, temperature, salinity, light, and other factors) should support species that are more polymorphic (species containing morphologically different individuals). In contrast, monotonous environments (such as the deep-sea bottom) should support monomorphic species.

Many other studies have indicated correlation of allele (one of a pair of genes at loci of a chromosome which give rise to different characteristics) frequencies with environmental heterogeneity which suggest an adaptive significance in agreement with the selectionists.

To relate genetic variability to environmental variability six bivalve mollusk species were studied at two enzyme synthesizing loci. The results indicate that the number of alleles decreased as the depth increased at which the mollusks were taken; that is, the enzyme synthesizing capability decreased at the greater depth (the more constant the environment). The author concluded that environmental variability regulates genetic variability at the two enzyme synthesizing loci of the molluscan chromosomes.

[2 tables, 23 references]

SW

0.39 FOOD PARTICLES AS A SITE FOR BIOHYDROGENATION OF UNSATURATED FATTY ACIDS IN THE RUMEN

Harfoot, Christopher G., Raymond C. Noble, and John H. Moore (Hannah Research Institute, Ayr Ka6 5HL, United Kingdom)
Biochemical Journal 132, No. 4, 829-832 (Apr. 1973)

The conversion to stearic acid (an 18 carbon, saturated fatty acid) from C_{18} polyunsaturated fatty acids, via several intermediates, in the rumens of cattle and sheep was reported by other workers. In this process, the relative activity of the major components of the rumen contents--bacteria, protozoa, cell-free supernatant, and fine food particles--is not known. To illuminate the action of these major components, experiments were performed with the contents of sheep rumen and linoleic acid, a polyunsaturated, 18 carbon fatty acid designated $C_{18:2}$.

Rumen contents from four sheep were strained, pooled, and diluted eight times with a buffer solution (gassed with hydrogen and nitrogen to displace oxygen) and distilled water. Sucrose and ammonium carbonate were added as carbon, energy, and nitrogen sources. The mixture was fractionated by centrifugation into a cell-free component, a component containing either bacteria or protozoa, and a component containing only fine food particles. The fractions, and a portion of the whole mixture, were incubated with linoleic acid and tested for C_{18} acid and intermediates over a 6-hr. period. The results show that about 90% of linoleic acid was utilized in the whole mixture, in the first hour of incubation. Transient production of the intermediates $C_{18:2}$ *cis*-9-*trans*-11 conjugated dienoic acid, followed by $C_{18:1}$ *trans*-11 acid was found. Rapid conversion to stearic acid ($C_{18:0}$) completed the reaction. Stearic acid accounted for about 65-70% of the linoleic acid added. In

0.36 (9.19)

of arsenic appears to take place through the skin and gills of the fish; this absorption (as far as could be determined by the methods used in the study) does not result in the formation of arseno organic compounds. When radioactive arsenic is mixed in the feed (and absorbed through the digestive tract) arseno organic compounds are synthesized and accumulated in the eyes, throat, gills, and certain internal organs of the fish.
[8 figures, 8 references] FTP

0.36 (0.38) EFFECT OF TEMPERATURE ACCLIMATION UPON SUCCINIC DEHYDROGENASE ACTIVITY FROM THE EPAXIAL MUSCLE OF THE COMMON GOLDFISH (CRASSIUS AURATUS). II. LIPID REACTIVATION OF THE SOLUBLE ENZYME

Hazel, Jeffrey R. (Dep. Physiol. Biophys., Univ. Illinois, Urbana, Ill.)
Chemical Abstracts 78, No. 5, 25752v (Feb. 5, 1973)

0.39

incubations of the fractions of rumen content, major conversion of $C_{18:2}$ acid to C_{18} acid (or hydrogenation) took place in the food particle fraction. Less than one-third of the conversion took place in the bacteria, protozoa, or cell-free fractions. The authors suggest that this work provides evidence of an extracellular hydrogenation process that follows extracellular lipolysis of esterified lipids in the rumen.
[2 tables, 9 references] SW

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The results indicate that FFA mobilization and FFA utilization is affected by the different metabolic states induced by stress. FFA mobilization increases during physiological stress; the amount of FFA oxidized depends upon the amount mobilized and upon the metabolic rate of the tissue using FFA as an energy substrate. FFA mobilization is inhibited and FFA utilization is depressed during the stress of anaphylactic shock. When the mobilization of FFA is raised to a normal range with norepinephrine or by increasing the energy demand with exercise, the FFA oxidation rate is not affected.

Apparently, the rate of delivery of energy from the substrate to the tissues by the circulation and by the oxidative system in these tissues are of equal importance for our biological survival under basal conditions; under stress they play an even more significant role.
[4 tables, 22 references] FTP

0.36 THE USE OF RADIOACTIVE ISOTOPES TO MEASURE THE TRANSFER OF MATERIALS IN AQUATIC FOOD CHAINS

Conover, R. J., and V. Francis (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada)
Marine Biology 18, No. 4, 272-283 (Feb. 1973)

Isotopic tracers have been used extensively over the past 20 years in the study of transfer processes in aquatic ecosystems. Further, physiologists and biophysicists have used isotopic techniques to study transfer processes within organisms and organ systems. The authors state that ecologists are not aware of the related literature that has been generated; consequently, their use of isotopes is naive. The authors further suggest that the majority of published work dealing with the uptake of a radioactive tracer to estimate feeding or incorporation rates probably contains erroneous information. The experimenters were in error because of apparent misunderstanding of basic tracer theory and the limitations of the method.

Unless it is known that no recycling of isotope has occurred during an experiment, the assumption of linear uptake when the system is not linear, even over short periods, can lead to significant errors in the estimation of ingestion. If the experiments are designed in which the test organism sums or integrates the maximum number of rate processes, following the uptake or loss of an isotope as a function of time can be greatly simplified. If a food supply is uniformly labeled, the rate of change of tracer can be used to give a rate of ingestion. If a predator is labeled before the experiment, the rate of loss of its isotope burden can be used to determine metabolism. The authors show various models of interaction between organisms, environment, and food to describe the recycling of isotopes and how to manage the information to provide valid results.
[5 figures, 4 tables, 29 references] SW

0.39 THE EFFECT OF GLUCOSE, INSULIN AND NORADRENALINE ON LIPOLYSIS, AND ON THE CONCENTRATIONS OF ADENOSINE 3′:5′-CYCLIC MONOPHOSPHATE AND ADENOSINE 5′-TRIPHOSPHATE IN ADIPOSE TISSUE

Knight, Brian L., and Jill Iliffe (Medical Research Council Lipid Metabolism Unit, Hammersmith Hospital, Ducane Road, London W12 OHS, United Kingdom)
Biochemical Journal 132, No. 1, 77-82 (Jan. 1973)

Other workers have reported that glycerol production decreased during the incubation of adipose tissue with adrenaline in the presence of insulin without glucose. Under the same conditions but with insulin and glucose and glucose alone, production of glycerol increased. Glycerol release is suggested as an indication of lipolytic activity in the tissue; further, glucose can overcome the antilipolytic effect of insulin and increase lipolysis in adipose tissue. Additionally, hormonal stimulation of adipose tissue lipase is mediated by 3′:5′-cyclic monophosphate (cyclic AMP); and the antilipolytic effect of insulin is related to a decrease in the concentration of cyclic AMP. The authors tested the possibilities that glucose could influence lipolysis by changing the intracellular concentrations either of cyclic AMP or adenosine 5′-triphosphate (ATP) (ATP is required for the stimulation of adipose tissue lipase).

Glycerol production and tissue concentrations of ATP and cyclic AMP were followed during the incubation of rat adipose tissue with and without glucose, insulin, and the hormone noradrenaline. The results indicate that glucose inhibited a decrease in lipolysis, as indicated by the rate of glycerol release, and had no

0.5 (2.3) ENTEROPATHOGENIC E. COLI--A NEW PROBLEM FOR THE FOOD INDUSTRY?

Insalata, Nino F. (Post. Div. Microbiological Research, General Foods Corp., 275 Cliff St., Battle Creek, MI 49016)
Food Technology 27, No. 5, 56, 58 (May 1973)

Recent outbreaks of food poisoning associated with enteropathogenic strains of Escherichia coli point out the need for members of the food industry to be aware of enteropathogenic E. coli (EEC) as a potential problem and to establish means of monitoring and controlling the organism in foods. This article gives some background information on EEC organisms and offers some approaches to establishing a control program. Many questions regarding EEC organisms in food remain unanswered. Some of these are: (1) What is the incidence of EEC in foods? (2) Are EEC organisms part of the natural microflora of foods or are they contaminants? (3) Are EEC organisms truly primary pathogens? (4) If EEC are truly pathogens, what is the tolerance level in humans? (5) For each food, how many organisms are required by a susceptible host to produce clinical symptoms? and (6) What problems may arise in isolating and typing the organisms? The answers to these and many other questions must be considered as prerequisites to the establishment of a control program.
[5 references] FTP

0.39 PREPARATION OF HIGH-MOLECULAR-WEIGHT DNA FROM FISH SPERM

Christen, Karl (Rephamac A.-G.) (pat.)
German Offen. 2,217,911 (Nov. 9, 1972)
Chemical Abstracts 78, No. 5, 26130c (Feb. 5, 1973)

0.39 EFFECT OF TSH AND PROLACTIN ON THE BEHAVIOR AND HISTOLOGY OF THE SKIN, THYROID GLAND, AND GONADS OF BLENNIUS PAVO

Bleum, Volker, Ludwig Machemer, and Wolf Dieter Bartmann (Inst. Tierphysiol., Rhur-Univ. Bochum, Bochum, Germany)
Chemical Abstracts 77, No. 25, 160352j (Dec. 18, 1972)

0.5 SENSITIVITY OF VIBRIO PARAHAEMOLYTICUS TO COLD IN OYSTERS, FISH FILLETS AND CRABMEAT

Johnson, Howard C., and J. Liston (Institute for Food Science & Technology, College of Fisheries, University of Washington, Seattle, WA 98195)
Journal of Food Science 38, No. 3, 437-441 (Mar.-Apr. 1973)

V. parahaemolyticus, a halophilic food poisoning organism, in laboratory media is sensitive to heat (killed at 60° C. for 5-15 min.) and to cold (dies out at temperatures below 6°-8° C.). Recently, the organism was isolated from samples of refrigerated and frozen market food. Thus, the organism may survive better in foodstuffs. The purpose of the present study was to find out if foodstuffs offer this protection. Strains of V. parahaemolyticus and V. alginolyticus were inoculated into shucked oysters, crab meat, and fish fillets; the samples were packaged in Polymylar pouches. Also, depurated live oysters were contaminated directly by exposing them to sea water containing V. parahaemolyticus. The test oysters were then shucked aseptically and packaged in the pouches. The oysters were stored at 11°, 8°, 5°, 1°, -15°, and -30° C.; the fish fillets and crab meat were stored at 1°, -15°, and -30° C. Samples from each lot were removed from storage at periodic intervals and the numbers of surviving organisms were determined, using selective and nonselective media. The total test period was 130 days.

In the oysters, the counts of the two organisms decreased during storage, but viable organisms could be detected up to 40 days in samples stored at 1° C. and up to 130 days in samples stored at -15° and -30° C. In the fish fillets, viable

0.4 LEARNING: CLASSICAL AND AVOIDANCE CONDITIONING IN THE MOLLUSK PLEUROBRANCHAEA

Mpitsos, George J. (Hopkins Marine Station, Pacific Grove, CA 93950), and William J. Davis (Thimann Laboratories, University of California, Santa Cruz, CA 95060) Science 180, No. 4083, 317-320 (Apr. 20, 1973)

The cellular processes that underlie learning are mostly not known, partly because appropriate experimental preparations have not been developed. These preparations, the authors indicate, must be capable of learning and must be susceptible to analysis on the level of single nerve cells. The gastropod mollusks may be used for such studies because their neuronal circuitry underlying simple behavioral acts can be comprehensively analyzed to provide background information for cellular studies of complex behavior phenomena. Also, gastropods appear to be capable of learning.

In the present study the researchers found that the feeding behavior of the carnivorous marine gastropod P. californica can be conditioned, and that the effects of this conditioning can be detected in the isolated nervous system. These initial electrophysiological results seem to indicate that the cellular basis of associative learning can be studied further in Pleurobranchaea.
[2 figures, 19 references]

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organisms were detected after about 60 days in the samples stored at -15° and -30° C. and after 15 days in those stored at 1° C. In the crab meat, viable organisms were detected after about 30 days in those samples stored at 1°, -15°, and -30° C. Thus, V. parahaemolyticus could survive in contaminated seafoods during normal conditions of commercial handling.
[3 figures, 4 tables, 24 references]

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0.6 GRANULAR PROTEIN CONTAINING FOOD PRODUCT RESEMBLING THE NATURAL CAVIAR OF STURGEON, SALMON AND OTHER FISH, AND A METHOD OF PREPARING SAME

Solomatskiy, Grigoriy Lvovich, Vladimir Borisovich Tolstoguzov, Vera Alexandrovna Ershova, and Dmitry Borisovich Izjumov (Moscow, U.S.S.R.); assignors to Ordena Lenina Institute Elementoorganicheskikt Soedinenyj, Moscow (pat.)
U.S. Patent 3,717,469
Official Gazette of the U.S. Patent Office 907, No. 3, 764 (Feb. 20, 1973)

This granular food product, resembling natural caviar, contains an aqueous colloidal solution of proteins, gelatin, ions of alkaline earth metals, polysaccharides capable of forming ionotropic gels when interreacting with the stated ions, and vegetable tannins. FTP

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effect on concentrations of cyclic AMP. The authors suggested that glucose stimulates ATP production which removes free fatty acids, but this reaction alone does not affect lipolysis. The authors further suggest any effect of glucose upon lipolytic activity involves the influence of ATP, metal ions, and free fatty acids.
[4 figures, 32 references]

SW

0.6 PRINCIPLES OF PACKAGE DEVELOPMENT
(0.8)(9.6)

Griffin, R. C., Jr., and S. Sacharow
Avi Publishing Co., P.O. Box 831, Westport, CT 06880. (1972), 321 pp. Price $17.00; foreign $18.00.
Burton R. Lindquist (reviewer) (Packaging Research & Development, Armour Food Company)
Food Technology 27, No. 5, 170 (May 1973)

A broad overview of packaging and the principles of packaging are presented in this book. The book is divided into two parts. The first part deals with basic principles and covers history, relationship of packaging development to production and marketing needs, packaging materials and forms, and package testing. The second part deals with the development process and covers manufacturing, equipment, marketing, government regulations, and ecological considerations. Included is a discussion of the function of packaging in feeding the hungry world.

FTP

0.39 BIOSYNTHESIS OF ASTAXANTHIN. V. INTERCONVERSION OF THE ALGAL CAROTENOIDS OF STIGEOCLONIUM INTO FISH CAROTENOIDS OF FANCY RED CARP

Katayama, Teruhisa, Haruhiko Tsuchiya, and C. O. Chichester (Fac. Fish., Kagoshima Univ., Kagoshima, Japan)
Chemical Abstracts 78, No. 1, 215j (Jan. 8, 1973)

0.7 QUANTIFICATION OF LOWERED CHOLESTEROL OXIDATION IN GUINEA PIGS WITH LATENT VITAMIN C DEFICIENCY

Ginter, E., R. Nemec, J. Červeň, and L. Mikuš (Institute of Human Nutrition Research, Bratislava, Czechoslovakia)
Lipids 8, No. 3, 135-141 (Mar. 1973)

The purpose of this study was to determine the transformation of 26-^{14}C-cholesterol to bile acids in normal and in vitamin C-deficient guinea pigs by measuring the $^{14}CO_2$ output and cholesterol specific activity. Male guinea pigs were fed a scorbutigenic diet and then were divided into a control group (fed 10 mg. ascorbic acid per animal per day) and a group with latent vitamin C deficiency (2 weeks on the scorbutigenic diet, followed by a maintaining dose of 0.5 mg. ascorbic acid per animal per day). After 13 weeks (the animals weighed 500 g. and their weight curves had leveled off), 26-^{14}C-cholesterol was administered intraperitoneally to all the animals. The ^{14}C excretion in the expired CO_2 and the urine and the cholesterol specific activity in the blood serum and liver were examined at intervals of 24 hr. and 1, 3, 5, 7, 9, and 11 weeks.

The ascorbic acid level in the liver and spleen of the control group of guinea pigs was five times higher than that in the vitamin C-deficient animals; the total cholesterol level in the serum and liver was higher in the vitamin C-deficient animals. The size of the cholesterol pool (blood and tissues with rapid cholesterol exchange) was greater in the vitamin C-deficient guinea pigs. Latent vitamin C-deficiency caused a slowing down of the rate of transformation of cholesterol to bile acids. There was a correlation between the liver ascorbic acid level and the rate of cholesterol transformation to bile acids.

0.7 TRACE MINERALS IN FOODS: NUTRITIONAL-TOXICOLOGICAL PROBLEMS

Fox, M. R. Spivey, and Helen Reynolds (Bureau of Foods, Food and Drug Administration, Washington, D.C.)
Feedstuffs 45, No. 13, 30, 51 (Mar. 26, 1973)

This article is one of the papers presented at the 1972 Animal Nutrition Research Council meeting.

The potential for contamination of the food supply with excessive inorganic elements has increased in level and diversity as industrialization advances in civilization. More information is required and the practical significance must be determined of the levels of toxic elements in foods. In the absence of information on a toxic form of an element, the levels of selected elements in foods should be monitored to generate information which will help to identify problems. Monitoring programs have been undertaken by the Food and Drug Administration (FDA). Diet composites are being analyzed for mercury, cadmium, arsenic, lead, selenium, zinc, and pesticides.

The interrelation between toxic elements and essential nutrients have two characteristics in man: (1) Inadequate intake of an essential nutrient may increase the adverse effects of a toxic element, and (2) an excess intake of an essential nutrient may be protective against a toxic element.

An FDA diet survey indicated that the cadmium intake of an adult man would be 30 µg. per day. Other reports showed that an adult man would be exposed to cadmium per day at the rate of 50 mg. in food, 10 mg. in water, and 20 mg. in 20 cigarettes. Some foods accumulate cadmium per 100 g. serving as follows: oysters

0.7 (4.6)(7.67) EFFECT OF VITAMIN E AND SELENIUM ON TISSUE ANTIOXIDANT STATUS OF RATS

Chen, Linda H. (Dept. of Nutrition and Food Science, University of Kentucky, Lexington, KY 40506)
Journal of Nutrition 103, No. 4, 503-508 (Apr. 1973)

Two animal experiments were performed with weanling, male, Sprague-Dawley rats to study the relationship of vitamin E and selenium on tissue antioxidant status. In experiment 1, 60 rats were fed basal diets supplemented with gradient levels of vitamin E. Sodium selenite (Se 1 ppm) was added to the diets of half the rats. In experiment 2, 48 rats received diets containing selenium (1 ppm) as sodium selenite, selenomethionine or selenocystine, with or without supplementation of vitamin E. After 4 weeks, liver peroxidation was determined by thiobarbituric acid (TBA) assay. Dietary selenium compounds as well as vitamin E lowered TBA values ($P < 0.01$). Sodium selenite at 1 ppm was as effective as 15 IU/kg diet of vitamin E in decreasing the peroxidation of liver lipids. The three selenium compounds were not significantly different in their effect. Vitamin E, sodium selenite, glutathione, ascorbic acid and butylhydroxyanisole added in vitro lowered TBA values of vitamin E-deficient rat liver homogenate, whereas methionine, selenomethionine and selenocystine added in vitro increased the TBA values. It is suggested that metabolites of dietary selenomethionine, selenocystine and methionine improved tissue antioxidant status of rats. Author's abstract

0.7 EFFICIENCY OF TRANSFER OF POLYUNSATURATED FATS INTO MILK

Bitman, Joel, L. P. Dryden, H. K. Goering, T. R. Wrenn, R. A. Yoncoskie, and L. F. Edmondson (Animal Physiology and Genetics Institute, Nutrition Institute and Dairy Products Laboratory, U.S. Dept. of Agriculture, Beltsville, MD 20705)
Journal of the American Oil Chemists' Society 50, No. 3, 93-98 (Mar. 1973)

T. W. Scott and his associates [Aust. J. Sci. 32, 291 (1970) and JAOCS 48, 358 (1971)] developed a technique by which the polyunsaturated fat content of milk was increased by feeding cows polyunsaturated oils encased in a formaldehyde-protein coat. The formaldehyde-protein coating is stable in the rumen where, by the action of microorganisms, lipolysis and hydrogenation occur and the polyunsaturated fatty acids are converted to saturated fatty acids. But, when the formaldehyde-protein coated polyunsaturated fats pass on to the abomasum (pH 2-3), the coating is hydrolyzed and the polyunsaturated fatty acids are then absorbed and transferred into the milk. The present study examined the efficiency of transfer of the polyunsaturated fats into milk when two different techniques were used to protect the unsaturated fats fed to the cows: (a) the Scott et al. encapsulation procedure and (b) treatment of soybeans with formaldehyde.

The encapsulated polyunsaturated fat particles were prepared by adding formaldehyde to a homogenate of safflower oil and 12.5% sodium caseinate and then spray drying the mixture. The treated particles contained 58% safflower oil, 40% casein, and 2% formaldehyde. The soybean particles were prepared by incorporating formaldehyde into soybeans, full-fat soy flour, or full-fat soy flakes. The safflower

0.7

NITRITE-INDUCED METHEMOGLOBINEMIA IN GUINEA PIGS: INFLUENCE OF DIETS CONTAINING BEETS WITH VARYING AMOUNTS OF NITRATE, AND THE EFFECT OF ASCORBIC ACID, AND METHIONINE

Stoewsand, G. S., J. L. Anderson, and C. Y. Lee (Dept. of Food Science and Technology, New York State Agricultural Experiment Station, Cornell University, Geneva, NY 14456)
Journal of Nutrition 103, No. 3, 419-424 (Mar. 1973)

Experiments were conducted with young, male guinea pigs to investigate the influence of feeding a vegetable with naturally occurring low and high amounts of nitrate, and the influence of dietary supplementation of ascorbic acid and methionine on nitrite-induced methemoglobinemia. Freeze-dried red table beets were incorporated into experimental diets. They contained either a low or high amount of nitrate from manipulation of nitrogen fertilization rates during their growing period. High nitrate-containing beet diets, or nitrate added to diets, did not induce methemoglobinemia. High nitrate diets fed to guinea pigs enhanced nitrite-induced methemoglobinemia. Low nitrate-containing beet diets seemed to "protect" guinea pigs from nitrite toxicosis. Purified diets containing 1% added L-ascorbic acid slightly reduced nitrite-induced methemoglobin blood levels of normal guinea pigs compared to those fed 0.02% ascorbic acid, but there was an additional 50% reduction when 1% methionine and 1% or 2% ascorbic acid were included in the diet.
Authors' abstract

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oil-protein particles or soybean preparations were fed to Holstein cows as a partial replacement of grain on a weight by weight basis. The standard rations consisted of medium quality orchardgrass hay and a mixed concentrate.

The efficiency of transfer of dietary 18:2 fatty acids ranged from 17% to 42% for the safflower oil-casein-formaldehyde preparations and from 2% to 8% for the soybean particles preparations (% transfer = 18:2 fatty acid content of the milk fat per dietary 18:2 fatty acids times 100). The 18:2 fatty acid content of the milk fat increased from basal levels of 2-3% of total fatty acids to 35% with certain safflower oil-casein-formaldehyde particles supplements and 7% with soybean particles supplements. The fatty acids that showed compensatory declines were palmitic (16:0), which decreased from 35% to 14%, and myristic, which decreased from 13% to 4%, as the safflower oil-protein formaldehyde supplement level increased from 0 to 2,278 g. per day in the diet of the cows. The blood cholesterol, triglycerides, and nonesterified fatty acids all increased markedly when the cows were fed increasing amounts of safflower oil-protein-formaldehyde supplements. The cholesterol content of the milk did not increase.
[9 figures, 4 tables, 11 references]
FTP

0.7

The results indicate that ascorbic acid is necessary for a normal course of cholesterol catabolism. Also, in latent vitamin C deficiency, the rate of cholesterol catabolism slows down and cholesterol accumulates in the blood and liver of vitamin C-deficient guinea pigs.
[2 figures, 3 tables, 33 references]
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52 µg., clams 40 µg., beef liver 24 µg., and beef kidney 48 µg. Studies of dietary cadmium in quail show that as cadmium was increased, interference was observed in absorption of required minerals.

In studies of elements in diets, the authors suggested the formulation of one reference control diet that would permit comparisons among laboratories and serve as the prototype for subsequent reference diets.
[3 tables, 12 references]
SW

0.7 EFFECT OF DIETARY EXCESSES OF LYSINE AND ARGININE ON THE DEGRADATION OF LYSINE BY CHICKS

Wang, Shu-Heh, L. O. Crosby, and M. C. Nesheim (Dept. of Poultry Science and Graduate School of Nutrition, Cornell University, Ithaca, NY 14850)
Journal of Nutrition 103, No. 3, 384-391 (Mar. 1973)

The factors influencing lysine degradation were investigated by studying the level of liver lysine-ketoglutarate reductase (the initial degradative enzyme) and the conversion of ^{14}C-lysine to $^{14}CO_2$ in the intact chick. Liver lysine-ketoglutarate reductase activity was increased by excesses of dietary lysine, but not arginine, and kidney arginase activity was increased by excesses of both arginine and lysine. The rate of ^{14}CO production from ^{14}C-lysine in vivo correlated with the lysine-ketoglutarate reductase activity measured in vitro when a loading dose of lysine was given. No correlation was observed when a trace dose was given. The rate of lysine oxidation was stimulated by lysine, but excesses of dietary arginine did not increase lysine oxidation. Genetic differences in lysine-ketoglutarate reductase and the rate of ^{14}C-lysine oxidation were observed between the high arginine and low arginine requirement strains. These findings suggest that the rate of lysine oxidation in vivo may be regulated by the lysine pool at low levels of dietary lysine, and by the level of degradative enzyme at high levels of dietary lysine. Authors' abstract

0.8 (2.3) GEOMETRY OF CIRCULAR CUTTER AND ITS INFLUENCE ON SPECIFIC CUTTING FORCE OF FISH RAW MATERIAL

Kawka, Tadeusz (Institute for Exploitation of Sea Resources, Szczecin, ul. Kazimerza Królewicza 4, Poland)
Acta Ichthyologica et Piscatoria 2, No. 1, 141-150 (1972) Szczecin, Poland

The author investigated the relation of circular cutter geometry to specific cutting force in the cutting of fish. The results indicated that the value of blade angle has an influence on cutting force in a linear relation: the lower the angle of the blade, the lower the specific cutting force. In addition, a cutter ground on both sides allowed the cutting force to be decreased about 10% from that found necessary for a cutter ground on one side. There was a limit to which the angle of the blade could be reduced; a cutting angle below 10°-15° caused early blunting of the edge. A cutting angle of 20° was found to be best. It was further found that the cutting force required by a plain, disc-shaped blade could be reduced about 15% by removing cut-outs evenly spaced around the circumference. Other information gained indicated that cutting force depends on the species of fish and condition.

For example, the specific cutting force required for Norway haddock is three times higher than for mackerel. The cutting force necessary for fresh fish is higher than for thawed fish. The coarseness or fineness of scales and the toughness of muscle, fresh and thawed, are influencing factors also.
[7 figures, 5 references] SW

0.8 CHEMICAL OXIDATION METHODS IN WATER TREATMENT

Atkinson, John W. (Manchester Corporation Waterworks, Manchester, England), and A. T. Palin (Newcastle and Gateshead Water Company, Newcastle-upon-Tyne, England)
Critical Reviews in Environmental Control 3, No. 2, 153-166 (Feb. 1973)

Natural and polluted waters can contain impurities such as nitrogenous and non-nitrogenous (organic and inorganic) substances and reducing agents such as oxidizable metals that are amenable to chemical oxidation methods of purification. The choice of oxidant is limited because the water is normally destined for human use. The chemicals discussed are chlorine, chloramine, chlorine dioxide, ozone, and potassium permanganate; the factors which govern the choice of chemical are indicated. The author describes the reactions involved and the results that may be achieved in practice by the application of chemical oxidation methods.
[80 references] FTP

0.9 CANALS COOL HOT WATER FOR REUSE

Miller, Stanton S.
Environmental Science & Technology 7, No. 1, 20-21 (Jan. 1973)

Florida Power & Light Company (FPL) has developed a unique concept for power generation and cooling water requirements for its four power plants at Turkey Point, Fla., 25 miles south of Miami. Two conventional oil-fired plants and two nuclear plants are located at Turkey Point. All are in operation, except the second nuclear plant, which is scheduled for initial startup in about 1 year.

The two conventional plants were already operating, and the nuclear plants were under construction when the concern about thermal pollution arose. A resulting Justice Department suit against FPL was settled by a consent decree worked out during numerous meetings between government officials and FPL. The decree is specific about every phase of the cooling requirements. It gives detailed specifications on operation of the cooling system in regards to velocity, volume, and water temperature as well as monitoring requirements. It also specifies terms for the operation of an "interim system." This system, a temporary measure until a "closed system" can be constructed, takes in water from Biscayne Bay to cool the condensers, then (after performing its cooling function) mixes it with more bay water and sends it along a 6-mile canal to cool further. The water is then dumped into Card Sound, located just south of Biscayne Bay. The only restriction is that water cannot leave the canal in excess of 95° F.

The closed system is similar to the system just described, except that it will have 38 canals (for a total length of 168 miles), enough to allow the water to

0.8 (9.19) CUTS RIVER POLLUTION

Anonymous
Food Engineering 45, No. 4, 122 (Apr. 1973)

The Escatawpa River at Moss Point, Miss., was being polluted by bailing water used to transport menhaden from the catch boat to the processing plant. About 350,000 gal. of bailing water were required to lift one million fish into the plant. The water was pumped back to the river untreated. A specialist in water and waste treatment from the Unitech Co., investigated the possibilities of reducing pollutants entering the river. The results of the investigation showed that the bailing water could be treated and re-used. Since the bailing water was moved by a positive displacement pump, a smaller quantity of water was required in comparison to a centrifugal pump; and this quantity of water could be (stepwise) stored, re-used until solids content was increased, and then processed. The stored water containing the solids is pumped through oil and solids separators; the clarified water passes to an evaporator where remaining suspended particles are concentrated to 50% solids. The condensate is returned to the bailing water storage tank for use again. All oil and suspended particles recovered are used to increase the fishmeal yield. The firm has reduced bailing water consumption by 97% which allows the evaporator system to work within capacity, and fishmeal yield has increased. Pollution of the river was reduced.
[1 figure]

SW

0.9

cool sufficiently for recycling. Some makeup water will have to be brought in from the bay occasionally, and periodically the system must be purged. The closed system is expected to be completed by late 1974; eight canals have been completed to date.

Other cooling techniques were considered, but were eliminated: cooling towers on marsh land were not feasible, there was no U.S. experience in the use of salt water in utility cooling towers, and deep-well injection was not practical in the marsh area.

FPL has 10 major electric utility plants in Florida and has some under construction. It is taking preventive measures against thermal pollution from all of its plants, but cooling requirements are dictated by environmental requirements of the area where they operate. No uniform solution to every situation has yet been found.
[3 figures]

Lee Thorson

0.7 (4.6)(7.67) NUTRITIONAL INTERRELATIONSHIPS AMONG VITAMIN E, SELENIUM, ANTIOXIDANTS AND ETHYL ALCOHOL IN THE RAT

Levander, O. A., V. C. Morris, D. J. Higgs, and R. N. Varma (Nutrition Institute, Agricultural Research Service, U.S. Dept. of Agriculture, Beltsville, MD 20705)
Journal of Nutrition 103, No. 4, 536-542 (Apr. 1973)

Giving 20% alcohol as the sole drinking fluid delayed the onset of liver necrosis in rats fed a basal diet deficient in vitamin E and selenium. Addition of ethanol in vitro had no effect on the decline in respiration suffered by liver slices prepared from vitamin E- and Se-deficient rats. Determination of hepatic triglycerides in rats given alcohol for 5 to 6 weeks revealed that animals fed the basal vitamin E- and Se-deficient diet tended to have less fat in their livers than animals fed the same diet supplemented with either 500 ppm vitamin E or 0.3 ppm Se as Na_2SeO_3, or both. Certain fat-soluble antioxidants tended to diminish the hepatolipogenic action of ethanol, whereas vitamin E or Se did not. Examination of the time course of the development of alcoholic fatty liver showed that animals fed either the basal necrogenic diet or the basal diet supplemented with vitamin E and Se underwent a similar pathogenesis of alcoholic fatty liver for about 4 weeks. After this time, however, the vitamin E- and Se-deficient animals lost much of their liver fat, whereas the vitamin E- and Se-supplemented animals did not. The sparing action of alcohol on vitamin E- and Se-deficient animals appears inconsistent with a lipoperoxidative mechanism for chronic ethanol hepatotoxicity. The fact that vitamin E and Se tended to enhance the development of alcoholic fatty liver, whereas certain fat-soluble antioxidants did not, seems inconsistent with an antioxidant role for these two nutrients. Authors' abstract

0.9 WHAT MANAGEMENT EXPECTS FROM R&D TODAY

Charpie, Robert A. (Cabot Corp.)
Research Management 16, No. 2, 7-9 (Mar. 1973)

The priorities for research and development (R&D) are inseparable from the major problems of top management of a company. These priorities consist of finding ways to reverse the trend of losing businesses, keeping the plus business growing, and finding rewarding new areas for new investment. If R&D is to successfully pursue these priorities, it must meet four requirements: (1) realistically appraise the environment in which R&D lives, (2) develop a balance in dealing with each of the foregoing priorities, (3) solve quality problems through hard work, and (4) get results every day. This article is a discussion of each of these requirements.

FTP

0.9 MAINTAINING VITALITY AND PRODUCTIVITY IN R&D -- STEPS TO MAINTAIN HIGH LEVEL PERFORMANCE

Decker, W. D., and C. M. Van Atta (Lawrence Livermore Laboratory, University of California)
Research Management 16, No. 2, 20-23 (Mar. 1973)

The authors spent over 1 year visiting various R&D laboratories to learn of their policies and practices in operation and to determine what steps management can take to maintain a vital and creative staff. The five most used actions for acquiring a vital staff are: (1) Hire for new technology and recent training. This is essential for an R&D organization because of the need for continual input of new techniques and fresh ideas. (2) Expect reasonable (and desirable) turnover of professional employees. (3) Management of R&D organization might do most of its hiring through its research groups and then fill the jobs that demand less creativity from within. (4) Term employment may be used. (5) A postdoctral program may be used whereby scientists, particularly, are hired for a 1- or 2-year period to carry out independent research--occasionally exceptional prospects can be uncovered in this manner.

The steps involved in keeping a staff creative and productive are: (1) Critically evaluate employee performance to clearly determine his relative value to the organization. (2) Provide continuing education and training. (3) Rotate assignments of engineers and scientists to broaden their experience, avoid over-specialization, optimize job performance, and provide an infusion of new ideas into established positions. (4) Institute early retirement option that provides adequate

1.85 (1.0119)(1.012) (1.013) SHRIMP INDUSTRY OF CENTRAL AMERICA, CARIBBEAN SEA, AND NORTHERN SOUTH AMERICA

Gross, George B.
Marine Fisheries Review 35, Nos. 3-4, 36-55 (Mar.-Apr. 1973)

The area reviewed is part of the warm-water fishery of the Western Hemisphere. The shrimp fisheries are based on many species of the large, warm-water genus Penaeus. In some areas, several smaller species known as sea bobs are taken, but the larger penaeid shrimps predominate in the fishery.

Adult shrimps live on muddy sea bottoms in depths, depending on the species, from 1 to 50 fathoms. They spawn at sea, and the young move into coastal lagoons and estuaries where they live in brackish water. At the subadult stage they migrate to nearby ocean waters where they remain for the rest of their lives. Fishing areas are found where open waters cover mud bottoms adjacent to large brackish lagoons. On the Pacific coast the large shrimps can be found in a relatively continuous band from northern Mexico to northern Peru. The gaps exist along stretches of rocky and sandy shores. On the Atlantic side shrimps are found from the southern coast of the United States to Brazil, including the Gulf of Mexico and the Caribbean Sea. There are gaps in otherwise favorable areas around islands and along the mainland coast of the Caribbean Sea.

Commercial fishing for shrimp on the Pacific coast began in the 1950's in Panama and spread northward to Mexico and southward to Peru in the same decade.

1.82 (1.0117) A STUDY OF THE CLAM, RANGIA CUNEATA, IN LAKE PONTCHARTRAIN AND LAKE MAUREPAS, LOUISIANA

Tarver, Johnnie W., and Ronald J. Dugas
Technical Bulletin No. 5, Louisiana Wild Life and Fisheries Commission, Oyster, Water Bottoms and Seafoods Div., New Orleans, La. (Feb. 1973), 97 pp. Price not given.

The purpose of this study was (1) to determine the clamshell stocks and the rate of replenishment of the shell being harvested, (2) to determine the factors affecting the distribution, density, growth, and reproduction of the clams, and (3) to evaluate the effects of harvesting methods on the environment. The clam shells are used in the manufacture of cement, glass, chemicals, poultry and cattle feed, wallboard and other building products, agricultural lime, road construction, and as fill material in near-shore oil explorations. Also, the shells are used as cultch material in planned live oyster reefs. About 5 million cubic yards of clam shell are dredged annually from Lakes Pontchartrain and Maurepas.

The occurrence, distribution, and density of the clam populations were determined by the use of Peterson grid samples and a modified oyster dredge throughout Lakes Pontchartrain and Maurepas; also, hydrological, sedimentological, and plankton samples were analyzed to determine some of the factors affecting the distribution, density, and growth of the clam R. cuneata. The effects of dredging on the environment are discussed. The data indicate that clam reproduction, recruitment, and growth were occurring in the lakes, but that additional management procedures should be initiated to sustain the yield of clam shell. General recommendations

1.85 (1.0115) FISHERY FOR NORTHERN SHRIMP, PANDALUS BOREALIS, IN THE GULF OF MAINE

Wigley, Roland L. (National Marine Fisheries Service Northeast Fisheries Center, Woods Hole, Mass.)
Marine Fisheries Review 35, Nos. 3-4, 9-14 (Mar.-Apr. 1973)

The northern shrimp is a medium-sized species that was the basis for a small fishery along the south coast of Maine. This fishery began in 1938 and continued in a modest status until 1962. From 1962 to 1972, the landings and values of landings increased rapidly: 388,000 to 24,295,000 lb. and $57,000 to $4,557,000, respectively. The peak of the landings occurred in 1969--28 million lb.; at the same time fisheries in herring, hake, and haddock were declining. Additional crews and vessels thus became available for shrimping. Since 1969 the total catch has been declining, which may indicate that the maximum harvest of this stock has been attained. The vessels engaged in the fishery include modified lobster boats of 30- to 40-foot length, and small to medium-size trawlers, 50 to 75 feet, formerly engaged in fishing for whiting and other groundfish. A few Gulf of Mexico shrimp trawlers and similar style boats have been used recently in New England waters. The otter trawl, in several styles and sizes, is commonly used depending on the size of vessel, experience of the crew, type of bottom on the fishing ground, and other related factors. Shrimp pots are relatively new to the area, and may be best used on rocky untrawlable bottoms. Some vessels have facilities for boiling whole shrimp in brine. On other vessels, raw whole shrimp are packed in ice, for processing at port facilities. Processors at shrimp ports are equipped to clean, peel,

1.82 (1.0117)

to the industry involved (1) limited entry of new vessels, (2) limit vessel capacity, (3) restrict entry of new companies, (4) restrict fishing area, and (5) assign catch quota to each company.
[32 figures, 35 tables, 48 references] FTP

1.85 (1.0115)

cook, and freeze the shrimp. In the future, larger vessels, especially designed for shrimping will be more numerous, and will be working the fishery farther offshore in the warmer seasons of the year. The author anticipates that small shrimp will make up a larger proportion of the catch if future demand remains unchanged.
[6 figures, 5 tables, 7 references] SW

0.9

pensions for appropriate employees. (5) Salaries and raises should reflect clearly an employee's value to the organization. (6) Improve two-way communication within the organization. (7) Make efforts toward diversification, at least to show staff that management is alert to changing national and social needs. (8) Leave programs and personnel exchanges with other organizations must be administered carefully to ensure that employees are where they will do the most good.
[2 references] FTP

1.85 (1.0119)(1.012)(1.013)

Harvesting of known shrimp stocks on the Pacific coast is near maximum relative to limitations of numbers of vessels, size of boats, access to ports, and size of markets. Guatemala shrimp grounds are an extension of the Mexican grounds in the Gulf of Tehuantepec. The Guatemala grounds merge into those of El Salvador, which has only a Pacific coast. Shrimp production from coastal El Salvador has risen from the beginning in 1955 to a value of $6.155 million by 1971 in exports to the United States alone. The rocky bottom along the Nicaragua coast limits fishing for shrimp. With a Pacific coastline of 190 miles more shrimp landings should be expected than the $6.915 million worth shipped to the United States in 1971. The Pacific grounds of Costa Rica are not productive. The fishery for shrimp in Panama is very productive as is the adjacent Colombian coast. The Ecuadorian shrimp fishery is one of the best developed. Peru, at the southern edge of the range for the warm-water species of shrimp, has a small fishery.

Shrimp exports from the coasts of the Caribbean Sea began much later than from the Pacific coast. Caribbean shrimp occur only in environmentally restricted areas. One of these is in the extreme western Caribbean from the Yucatan Peninsula southward. A second area is off the eastern part of Honduras and the coast and islands of Nicaragua. A third and most productive area is off western Venezuela, in Lake Maracaibo, and the adjacent Gulf of Venezuela.

A short description of the shrimp fishery including landings, value of exports, and boats is given for each nation on the Atlantic and Pacific coasts.
[1 figure, 19 tables] SW

0.9 MAINTAINING VITALITY AND PRODUCTIVITY IN R&D--
STAFF OBSOLESCENCE--ITS COST AND PREVENTION

Branscomb, Lewis M. (IBM Corporation)
Research Management 16, No. 2, 16-19 (Mar. 1973)

Graduate education to a new Ph. D., for example, costs the individual and society $50,000 or more. The technical person, after about 40 years of subsequent employment will cost some one about a million dollars. Allowing such a person to lose his capability and confidence is a personal tragedy and a corporate waste. The responsibility for preventing the loss rests with the employers, the universities, and the individuals.
[2 references] FTP

1.86 (1.0117) A STUDY OF THE BLUE CRAB FISHERY IN LOUISIANA

Adkins, Gerald (Louisiana Wildlife and Fisheries Commission)
Technical Bulletin No. 3, Louisiana Wild Life and Fisheries Commission, Oyster, Water Bottoms, and Seafoods Div., New Orleans, La. (Dec. 1972), 57 pp. Price not given.

During the period of from July 1969 to June 1972, a survey was made of the blue crab fishery of Louisiana. This report is a discussion of the information collected and includes information on the hydrology of the fishing areas, biology of the blue crab, and management recommendations. During the past 10 years, over 9 million pounds of blue crab have been landed annually on the average in Louisiana, with an average annual landed value of about $621,000. Blue crab are harvested commercially with trotlines, trawls, and pots; pots account for the largest catch, but trawls contribute substantially during December and January. Several experimental trawls of basic otter trawl design were tried in various areas, and preliminary results indicate that they may be useful in improving the harvest of blue crab.
[27 figures, 12 tables, 108 references] FTP

1.89 (0.4) THE CROWN OF THORNS ON CORAL REEFS

Branham, J. M. (Dept. of Biology, University of Utah, Salt Lake City, UT 84112)
BioScience 23, No. 4, 219-225 (Apr. 1973)

Concern over possible destruction of coral reefs has aroused adverse interest in the starfish known as crown of thorns (Acanthaster planci). The presence of this starfish has been referred to as a "plague." The author reviewed the biology of, and historical references to, the starfish and corals to gain perspective on the problem and prepared this report.

The crown of thorns is about the size of a large dinner plate and can exceed one-half of a meter in diameter. Pacific specimens have 16 rays (or arms) usually, extending from a central disc, and covered with sharp spines. Their color in life is variable, green with red-tipped spines, sometimes gray. The spines, up to 5 cm. long, are sharp and can inflict painful wounds. The starfish are found on corals and feed by spreading the gastric sac over their prey to digest away its living tissue. This predation kills the coral polyps and affects the coral colony or reef. The coral reef has the ability to repel the predator with its own stinging capability, depending on the species of coral. Crustacean commensals which live in the colony may also drive the starfish away. A few animals prey on the starfish; one species of fish feeds on eggs as they are released; a coral species feeds on larvae of the starfish; triton shells, a trigger fish, a puffer fish, and the Napoleon fish have been reported to eat adults. These predators are no real threat to the starfish; man can rapidly destroy hundreds of thousands. The author stated that more effort is being spent to kill the starfish than to understand it.

1.9 (1.017) REPORT ON A TUNA POLEFISHING AND LIVE BAIT VENTURE, 'HOKO MARU 15': FEBRUARY 8 TO MARCH 24 1972.
SECTION 1: GENERAL INTRODUCTION
SECTION 2: BAIT FISHING

Webb, B. F.
Fisheries Technical Report No. 112, New Zealand Ministry of Agriculture and Fisheries, Wellington, New Zealand (1972), 61 pp. Price not given.

During the early part of 1972, experimental bait fishing was tried in the Marlborough Sounds, New Zealand. The purse seine and the purse seine fishing method are described, as are modifications made of the seine to adapt it to the particular fishing conditions involved. Although catches of bait fish were not great due to the limitations of the gear used, it appears that future commercial possibilities for a live-bait fishery are good.

As a guide for future bait fishermen, the specifications for a New Zealand bait vessel are given.

Section 3 on tuna fishing will be published later.
[18 figures, 24 illustrations, 2 tables, 8 references] FTP

2.110 (1.0116) TO CATCH A MILLION FISH

Tyler, Jim, and Mike McKenzie
Sea Grant Publication UNC-SG-73-05, Division of Commercial and Sport Fisheries, Dept. of Natural and Economic Resources, Chapel Hill, NC 27514 (1969), 17 pp. Price not given.

This booklet contains brief descriptions and illustrations of five kinds of gill nets; five seines; three net and four pot traps; five trawls; three dredges; four lines; and six other types of North Carolina commercial fishing gear. FTP

1.89 (0.4)

The concept of plagues and "population explosions" of the starfish has led to many suggestions as to the cause and to ways of eradicating the organism. The author does not believe that such an increase has occurred through reproduction. They are gregarious and can move fairly rapidly on tube feet. The fears of a population explosion may be the recent discovery of a natural phenomenon that has existed for a long time. The effect of the starfish on reefs is as variable as the reefs. Almost all the coral was killed on parts of the Great Barrier Reef and parts of coral reefs off Guam and Hawaii. But only a small part of the reefs was affected. Sometimes the starfish consume the polyps at the same rate they are growing--without destruction of the reef. Dead parts of reefs have been recolonized from the living parts. Dead reefs on the other hand are not new to the environment. Darwin mentioned a dead reef he found during a stop of the Beagle at Keeling Atoll (96° E. 7° N.) in 1860 [C. Darwin, 1860. The Voyage of the Beagle. The Natural History Library, Anchor Books, Doubleday & Co., New York (1962)]. There is enough doubt regarding the ecology of the crown of thorns and corals to stop uncritical destruction of the starfish.
[3 figures, 67 references] SW

2.112 (9.6) FAO CATALOGUE OF FISHING GEAR DESIGNS

Anonymous
Published by Fishing News (Books) Ltd., 110 Fleet St., London EC4 2SL, England. (1972), 155 pp. £5.00.
L. Walkear (reviewer)
Australian Fisheries 32, No. 3, 36 (Mar. 1973)

The book contains over 80 net designs and their rigging, with clear and self-explanatory drawings. Many of the gear designs are fished as otter trawls in vessels supplying 200 to 3,000 hp. There are also designs for purse seines, gill and tangle nets, dredges, pots, and long lines. Each design includes the dimensions of the vessels for which it is intended, but there is no text explaining operation of the gear. A wide range of basic information is provided on details of common netting yarns and ropes.

The reviewer commented that the gear designs are not better than those in common use in Australia today. SW

1.0115 (2.11) RHODE ISLAND'S FLOATING FISH TRAP FISHERY

Holmsen, Andreas A. (College of Resource Development, University of Rhode Island, Narragansett, RI 02282)
Marine Bulletin Series No. 14, Marine Advisory Service, Agricultural Experiment Station, University of Rhode Island, Narragansett, RI 02282 (1973), 10 pp.

This bulletin describes the floating fish trap fishery of Rhode Island and covers the topics of technology and techniques, landings, structure of the fishery, conflicts with other interests, laws affecting the fishery, law enforcement, and recommendations for law enforcement. Trap landings by species and percent of total catch for 1969-71 were: scup, 53%; mackerel, 13%; menhaden, 4%; squid, 4%; bonito, 3%; bluefish, 3%; sea robin, 3%; cod, 2%; and other species, 15%.
[10 figures, 8 tables] FTP

1.9 (1.0117) A STUDY OF COMMERCIALLY IMPORTANT ESTUARINE-DEPENDENT INDUSTRIAL FISHES

Dunham, Fred (Louisiana Wild Life and Fisheries Commission)
Technical Bulletin No. 4, Louisiana Wild Life and Fisheries Commission, Oyster, Water Bottoms, and Seafoods Div., New Orleans, La. (Dec. 1972), 63 pp. Price not given.

This study involved the area of Barataria Bay and Caminada Bay in Louisiana. The purpose was to obtain information that would aid the fishing industry in the best use of the fish resources. Samples were collected with plankton net and a 16-foot otter trawl, and other samples were obtained at various commercial fish plants.

Bay anchovy was the most abundant species (54.7%) caught in the trawls; the most abundant commercial fish species was the Atlantic croaker. Data on the number of fish eggs and larvae entering the bays did not always correlate with data on the true representation of the abundance of juvenile, subadult, and adult fish populations.

Samplings of commercial fish landings indicated that Atlantic croaker was over 65% of the total catch. Only about 0.05-1.5% of the catch from menhaden vessels were species other than menhaden.
[27 figures, 11 tables, 132 references] FTP

2.1129 (6.8) A NEW SYSTEM FOR THE COMMERCIAL HARVEST OF PRECIOUS CORAL

Grigg, Richard W. (Institute of Marine Biology, University of Hawaii), Boh Bartko, and Claude Brancart (Makai Range, Inc., Waimanalo, Hawaii)
Sea Grant Advisory Report UNIHI-SEAGRANT-AR-73-01, University of Hawaii, Honolulu, Hawaii (Feb. 1973), 6 pp.

Precious coral is used for jewelry. Dredging, primarily, is used for harvesting precious coral, but this method is destructive and inefficient. The world supply of precious coral is declining so that a means of harvesting it selectively is needed. This paper describes a new system for selectively harvesting precious coral by the use of a submersible.

The system consists of a reinforced wire basket attached to the front of a two-man submersible. The front of the basket contains a movable cutting blade. To harvest the precious coral, the submersible is maneuvered just off the bottom to the base of the coral. The coral is sheared off by the cutting blade and falls into the basket. Coral colonies which do not fall into the basket can be picked up by a manipulator (arm and claw) which is hydraulically operated. The payload of the wire basket is about 75 kg. of coral. A diagram of the precious coral harvesting system is shown in the figure that follows. This new harvesting system permits selective harvest of coral and is more efficient than conventional methods.
[3 figures, 6 references]

FTP

2.12 (1.85) AN AUTOMATIC PUMPING DEVICE FOR SAMPLING POSTLARVAL SHRIMP (PENAEUS SPP.)

Marullo, Frank (National Marine Fisheries Service Gulf Coastal Fisheries Center, Galveston Laboratory, Galveston, TX 77550)
Marine Fisheries Review 35, Nos. 3-4, 24-26 (Mar.-Apr. 1973)

In the past, studies were performed to investigate the possibility of predicting the size of total brown shrimp landings from indices of postlarval shrimp abundance. In the studies, samples of postlarval shrimp were collected during their migration into Gulf coastal bays. A 1.5-m. hand drawn beam trawl was used to take the samples. Although the trawl is an effective sampler, trawling is a difficult and time-consuming operation. Other limitations are: (1) sampling is conducted in shallow water away from the passes bearing the main tidal flow, and (2) detritus picked up by the trawl interferes with sorting the samples.

To overcome these problems an automatic sampler was fabricated which collects detritus-free samples at frequent intervals from the main tidal flow. The sampler consists of a diesel engine-driven pump, an electronic control panel, and a turntable equipped with a series of nets for collecting, preserving, and storing the samples. Tests were conducted to compare the automatic sampler with the Renfro beam trawl [U.S. Fish. Wildl. Serv., Circ. 161, p. 86-87 (1963)]. The average maximum catch per hour of the automatic sampler was five postlarvae while the beam trawl catch was larger per tow. The catch of the automatic sampler could be increased by enlarging the intake to the pump. A diagram of the automatic sampler is shown.
[2 figures, 9 references]

SW

2.140 TECHNOLOGY RESEARCH ON A SMALL BUDGET

Ben-Yami, M. (Fisheries Technology Unit, Israel)
Fishing News International 12, No. 4, 33-34 (Apr. 1973)

Although Israel's fish industry is small, it is diversified, spread out over three seas and a lake, and technologically, faces problems similar to those of a much larger fishery.

Having limited funds, the Fisheries Technology Unit (FTU) of the Israeli Department of Fisheries takes a "poor man's" approach to research and services. They discovered that the fishery suffers from lack of manpower, wage increases, and price stagnation. Until 1970, the yearly catch fluctuated between 1,000 and 1,500 tons of mostly sardinella (S. aurita) taken by a fleet of 35 catcher boats (9-14 meters long, decked but cabinless seiners) and two or three auxiliary work boats. Fish were usually detected visually and fishing was concentrated in areas close to the harbors. From a series of survey flights, the FTU found that statistically, the distribution of fish and fishing effort did not correlate.

To increase the productivity of the fishery, improved conditions for the fishermen and their catches were suggested. First, cabins were provided for the boats and refrigerated holds were specified for new purse seiners. These boats have also had their deck arrangements modified to change quickly to bottom trawling in the off-season. At the same time, the FTU conducted surveys with echo sounders to chart the grounds and to get a better idea of the seasonal distribution of commercial species. Further, whenever they spotted fish where there were no boats, they broadcasted the information by radio. Later, they would compile a general "fish synopsis" and, if possible, a forecast for distribution to the industry.

2.3 ULTRA-SONIC MEAT TENDERIZING APPARATUS

Guberman, Jerald, and Herman D. Holt; assignors to Advance Patent Technology, Inc., Las Vegas, Nev. (pat.)
U.S. Patent 3,711,896
Official Gazette of the U.S. Patent Office 906, No. 4, 1169 (Jan. 23, 1973)

Ultrasonic energy is used to break down the muscle fibers in meat, thus tenderizing the meat.

FTP

2.149 NAVIGATION FOR FISHERMEN AND BOAT OPERATORS
(2.116)

Motte, G. A. (Dept. of Fisheries and Marine Technology, University of Rhode Island, Narragansett, RI 02882)
Marine Bulletin No. 10, University of Rhode Island, Kingston, R.I. (1972), 75 pp. Price $3.50. (Available from the Marine Advisory Service, Univ. of Rhode Island, Narragansett, RI 02882)

This book continues where Marine Bulletin No. 7, "Chartwork for Fishermen and Boat Operators" leaves off. Readers of the present book should have a grounding in trigonometry and chartwork or must have satisfactorily completed the exercises in Marine Bulletin No. 7 on parallel, plane, and Mercator sailing. Chartwork involves plotting a ship's course in sight of land; navigation involves plotting a ship's course out of sight of land. Celestial navigation is the primary method of ocean navigation.

This textbook is divided into two parts; part 1 deals with the principles of navigation and part 2 deals with practical problems, including calculations and the use of nautical tables.

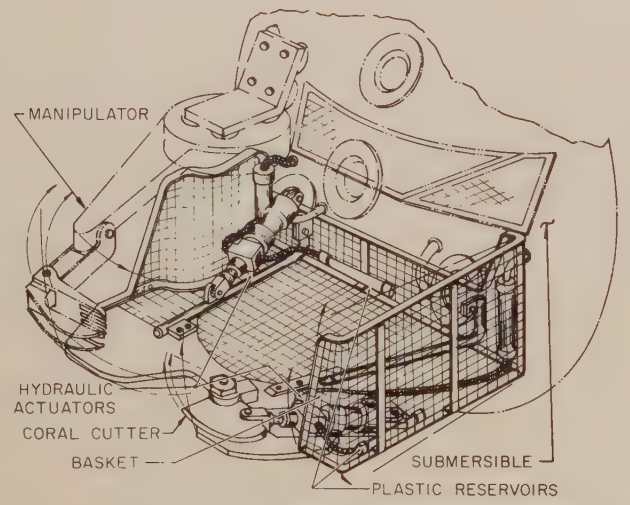
[Appendices] FTP

2.43 EDIBLE COATINGS AND SOLUBLE PACKAGING
(3.238)(3.338)
(9.6)
Daniels, Roger
Published by the Noyes Data Corp., Noyes Bldg., Park Ridge, NJ 07656 (1973), 360 pp. Price not given.

Ordinarily, food packaging (glass, metal, foil, and wax containers) is not part of the food. When the packaging in the form of film or coating is consumed with the food, then the packaging is classified as soluble or edible. External packaging is still necessary to protect foods coated in this manner from contamination; however, the amount of protection required for the food may be much less. This book contains descriptions, methods of preparation, and the patents of many coatings. These include amylose, cellulose, collagen, and protein coatings. Other chapters describe coatings for fruits and vegetables; raisins, dates, and sticky foods; nuts; cereal type products; bakery goods; salt coatings; and vitamins. A highlight of the book is the chapter describing coatings for meat and fish. These include the gelatin containing films and films composed of gelatin-propylene glycol, gelatin metaphosphate, and metal-gelatin (derived from aluminum salts or nontoxic, heavy metal salts such zinc). Other coatings for meat and fish are composed of algin-dextrose, water-in-oil emulsions, mono- and triglycerides, ethylcellulose, starch-gum dispersions, and fatty glycerides.

There are three indexes provided in the book: one is a list of companies owning the patents; the second is a list of the inventors; and the third is a list of all the patents mentioned, United States and British. SW

2.1129 (6.8)



2.140

This forecast is also aided by an infrared radiation thermograph which measures sea surface temperatures.

The FTU designed a very simple version of the hybrid purse seine which combines fast-sinking features and tapered ends with use of vertical rather than horizontal strips of netting. For trawls, they designed a vee door with a combination wood-steel door. These doors do not dig into the mud during shooting whenever a warp slackens excessively.

A member of the FTU measured the bollard pull of Mediterranean trawlers and seiners and found that engine and fishing power correlate only if equally efficient propellers can be fitted. Troubles such as a deteriorated propeller, underpowered engine, oversized gear, badly matched propeller, and other deficiencies were exposed during the bollard pull tests. Measurements from the bollard pull also aided small seiners (converted into dual purpose boats) to match gears.

Six years ago, a member of the FTU designed a slotted-blade propeller (SBP). Test results of the SBP show that (1) it is usable in conditions where a conventional propeller cannot be used; (2) it resists cavitational corrosion; (3) its steady torque enables optimum use of engine power under most conditions; and (4) it increases pull wherever it is installed. Production of the SBP now needs investment and specialized industrial expertise.

On other occasions, the FTU demonstrated electronic underwater and surface lamps to three Israeli purse-seining fisheries for bleak, mackerel, and sardine. In their assistance programs, they lend equipment to fisheries groups. In addition, the FTU recommends to lagoon fishermen that they use a mobile hauling system using one tractor; the suitability of a French gill net hauling machine was also tested. The response of the Israeli fishery to the innovations suggested by the FTU has been increased mobility, and skippers are paying more attention to the information provided. Mary Ellen Engett

3.12 PRESERVATION OF CHANNEL CATFISH WITH SOME SELECTED CHEMICALS

Beuchat, L. R., E. K. Heaton, and T. S. Boggess, Jr. (Dept. of Food Science, University of Georgia Agricultural Experiment Station, Experiment, GA 30212)
Journal of Food Science 38, No. 3, 531-535 (Mar.-Apr. 1973)

Dressed, skinned channel catfish were treated by dipping them in solutions containing various levels of pentasodium diethylenetriaminepentaacetic acid (NEAA), 2,4,4′-trichloro-2′-hydroxydiphenyl ether (CHPE), and methyl 2-chloroacetoacetic acid (MCA) singly and in combination in an attempt to improve the storage life of the product. The samples were stored at 0° C. Organoleptic examinations, surface microbial counts, shear press firmness measurements, pH, and moisture content determinations were made at 0, 3, 6, 8, 10, 13, 16, and 22 days of storage.

The treatments with NEAA and MCA helped preserve the organoleptic qualities of the dressed, skinned catfish, but CHPE did not. However, the population of microorganisms on the surface of the catfish was suppressed by the treatments containing NEAA and CHPE. The texture, pH, and moisture values did not show statistically significant differences as a result of chemical treatment. The authors believe that all three chemicals show promise for extending the shelflife of dressed, skinned channel catfish. [None of the stated chemicals is presently approved by the U.S. Food and Drug Administration as a food additive.]
[1 figure, 5 tables, 12 references]

FTP

3.15 (0.5) EFFECTS OF IRRADIATION ON THE SURVIVAL OF VIRUS IN WEST COAST OYSTERS

Di Girolamo, Rudolph, J. Liston, and J. Matches (Dept. of Biology, College of Notre Dame, Belmont, CA 94002, and Institute for Food Science and Technology, College of Fisheries, University of Washington, Seattle, WA 98105)
Applied Microbiology 24, No. 6, 1005-1006 (Dec. 1972)

The purpose of this study was to examine the ability of ionizing radiation to inactivate viruses in shellfish. Use of ionizing radiation has been proposed as a possible means of eliminating food pathogenic microorganisms from shellfish. Test oysters in aquaria were contaminated with poliovirus (strain Lsc-2ab). The whole oysters or the shucked oysters were exposed to 50, 100, 150, 200, 300, or 400 krads of radiation. The percent survival of the virus for the whole oysters varied from 87% at 50 krad of radiation to 13% at 400 krad and for the shucked oysters was 68% at 50 krad of radiation to 7.3% at 400 krad. There was significant survival of virus at all levels of radiation tested.
[2 tables, 7 references]

FTP

3.14 (6.132) PROCESS FOR KILLING SALMONELLA IN FISH MEAL

McConville, Thomas P. (Long Beach, Calif.); assignor to Westgate-California Foods, Inc., San Diego, Calif. (pat.)
U.S. Patent 3,723,136
Official Gazette of the U.S. Patent Office 908, No. 4, 1080 (Mar. 27, 1973)

In this process, fish meal is exposed to dichloromonofloromethane gas or Freon 21 gas to kill Salmonella.

FTP

3.239 (3.2382) EVAPORATION LOSSES FROM FROZEN MEAT IN RETAIL CABINETS

Cutting, C. L., and R. Malton (Meat Research Institute, Agricultural Research Council, Langford, Bristol, England)
Refrigeration and Air Conditioning 76, No. 900, 41-43 (Mar. 1973)

Many commercial operators of frozen food storage establishments erroneously believe that lower storage temperatures cause more loss due to drying than higher storage temperatures. Practical investigations and theoretical deductions contradict this belief and instead have confirmed the opposite; namely, with lower temperatures there is less loss due to drying. Drying is affected not only by temperature, but by air speed over the meat, the temperature difference between the air and the surface of the cooling coils, the fluctuations in air temperature, and, in retail display, heating induced by radiation from cabinet and shop lighting. In certain circumstances an increase in dehydration due to these other factors could outweigh a reduction of dehydration caused by lowering the temperature.

Experiments were performed to investigate the evaporation losses in frozen meat. Beef joints and steaks were wrapped in either 70- or 100-gauge PVC film or sealed in polyethylene bags. Sliced steaks and pork chops were packed in foam polystyrene trays overwrapped with either film. Half of the packs were punctured to reproduce damage that occurs in displays. The wrapped samples were stored in cabinets maintained at -30°, -12°, or -8° C. The results showed that meat stored in the lowest temperature cabinet lost weight least rapidly. Film wrapping eliminated overall weight loss but evaporation within the package was seen as ice

3.14 (6.24) PRESERVATION OF SHARK LIVER WITH SODIUM BISULFITE

Volkova, N. S., J. Franco-Betancourt, U. Vasquez, I. Pedroso, and M. Reboso (U.S.S.R.)
Chemical Abstracts 78, No. 8, 47698j (Feb. 26, 1973)

3.4 FISH PRODUCT

Unilever NV (pat.)
Netherlands Patent Application 7,111,727 (1972) (In Dutch)
Food Science and Technology Abstracts 4, No. 12, 12R669, 171 (Dec. 1972)

Portions of smoked fish adhering to one another are produced by treating raw, filleted fish with NaCl (or an edible phosphate) until the salt content is 0.5-12.0% of the wet weight of the product. The material is then formed and frozen, and exposed to wood smoke. The temperature of the fish during smoking should not be above -8° C. The method is suitable for cod, halibut, haddock, herring, and other members of the Clupeidae and Gadidae. Bloodstained or discolored fish should be removed before processing to maintain top quality. SW

3.239 (3.2382)

crystals deposited on the meat and inside of wrapper. Steak lost more weight than joints. Meat exposed to shop illumination showed higher temperatures and higher weight losses than packs in shaded areas in the cabinets. Drying was slower in unpunctured tightly fitting wraps. The authors concluded that the rate of surface desiccation and loss of appearance of frozen meat on display is minimized by maintaining an unfluctuating temperature as low as possible.
[3 figures, 5 tables] SW

3.12 PRESERVATIVE FOR USE IN FOOD INDUSTRY

Kovac, Jaroslav, and Jan Farkas (pat.)
Czech. (Patent) 144,649 (July 15, 1972)
Chemical Abstracts 77, No. 25, 163248r (Dec. 18, 1972)

3.15 THE EFFECT OF GAMMA RADIATION ON PRERIGOR MORTIS FILLETED COD

Jebsen, Jens W. (Chemico-Technical Research Institute of the Directorate of Fisheries), Gulbrand Lunde (Central Institute for Industrial Research), and Bjarne Underdal (Dept. of Food Hygiene, Veterinary College of Norway)
Fiskeridirektoratets Skrifter Serie Teknologiske Undersøkelser (Reports of Technological Research concerning Norwegian Fish Industry) 5, No. 11, Directorate of Fisheries, Bergen, Norway (1972), 14 pp.

Fresh cod fillets were packed in plastic bags and irradiated at 25, 50, 90, and 180 krad. Irradiated and control samples (not irradiated) of fillets were stored at 0° C. and examined at periodic intervals for proteolytic activity, total bacterial count, trimethylamine (TMA), total volatile base (TVB), volatile acids (VA), hypoxanthine, and glutamate-oxalacetate-transaminase (GOT).

The proteolytic activity in the irradiated cod fillets was considerably lower than that in the control (nonirradiated) fillets. Bacterial count was decreased by irradiation; the count correlated with the proteolytic activity. TMA, TVB, and VA values and hypoxanthine formation were retarded by irradiation. The GOT level was lower in the irradiated than in the nonirradiated fillets. The irradiated cod fillets were organoleptically acceptable after 27 days of storage at 0° C.; the nonirradiated fillets were acceptable for 14 days.
[9 tables, 27 references] FTP

3.4 SMOKE FLAVORING

Ross, S. W. (pat.)
U.S. Patent 3,709,700
Food Technology 27, No. 5, 188 (May 1973)

This barbecue additive imparts a smoke flavor to meats and other foodstuffs. FTP

3.239 USE OF PACKAGING MATERIALS DURING THE FREEZING OF FISH IN FAST-FREEZING APPARATUS

Voskoboi, A. V., and G. S. Konokotin (U.S.S.R.)
Chemical Abstracts 77, No. 25, 163146f (Dec. 18, 1972)

3.12 APPARATUS FOR CONTINUOUS ELECTROMAGNETIC STERILIZATION

Lipoma, Samuel P. (825 - 19th Place, Delano, Calif.) (pat.)
U.S. Patent 3,718,082
Official Gazette of the U.S. Patent Office 907, No. 4, 918 (Feb. 27, 1973)

Food,in or out of containers, is sterilized by a continuous process utilizing electromagnetic energy. FTP

4.86 CHROMATOGRAPHIC TECHNIQUES IN TANNERY CONTROL.
1. RAPID ESTIMATION AND QUANTITATIVE DETERMINATION
OF MINERAL OILS IN PRODUCTS LUBRICATED BY TANNING

Cot, J., A. Marsal, and M. Marquilles (Dep. Curtidos, Patronato 'Juan de la Cierva, Barcelona, Spain)
Chemical Abstracts 78, No. 6, 31437n (Feb. 12, 1973)

4.89 SPERMACETI-BASED EMULSIFIERS FOR OINTMENTS

Greve, Rainer (pat.)
German Offen. 2,117,661 (Oct. 19, 1972)
Chemical Abstracts 78, No. 2, 7835v (Jan. 15, 1973)

4.86 INFLUENCE OF FAT LIQUORING AND OTHER FACTORS
ON SEMIFINISHED LEATHER PROPERTIES. I.

Lacour, Norman, A., Alberto Angelinetti (Cent. Invest. Tecnol. Cuero, La Plata, Argentina)
Chemical Abstracts 78, No. 6, 31433h (Feb. 12, 1973)

6.132 (6.19) EFFECTS OF HEAT TREATMENT ON COMPOSITION AND
NUTRITIVE VALUE OF HERRING MEAL

Myklestad, Ole, Johan Bjørnstad (Norwegian Herring Oil and Meal Industry Research Institute, Bergen, Norway), and Leif R. Njaa (Government Vitamin Laboratory, Bergen)
Fiskeridirektoratets Skrifter Serie Teknologiske Undersøkelser (Reports on Technological Research concerning Norwegian Fish Industry) 5, No. 10, Fiskeridirektøren, Bergen, Norway (1972), 15 pp.

The purpose of this study was to determine the effect of heating herring press cake on the quality of the final herring meal, with emphasis on heating conditions comparable to those used commercially to prepare fish meal. These conditions, roughly, are reduction of fish press cake from about 50% moisture content to less than 10% moisture content at a maximum meal temperature of about 100° C. during a period ranging from 10 to 60 min.

In these experiments, simulation of commercial conditions was done with the use of a special stainless-steel rotary autoclave (volume of about 50 liters) equipped for heating and cooling. The test meals were prepared from herring that had been stored for 4 days on ice. The fish were processed in a continuous steam cooker at jacket pressure of 2 kg./cm.^{2}, and the emulsion of oil and stickwater was removed from the cooked material in a screw press. The press cake was ground, vacuum packaged in 1-kg. portions in plastic bags, and the packaged press cake was stored under nitrogen at -30° C. until required for the tests. In each experiment a batch of press cake was freeze dried to the appropriate moisture content to serve as the reference sample of meal. The test treatments of the press cake in

6.10 BARIUM-CONTAINING RUST-PREVENTING PAINTS

Kuehn, Martin (pat.)
German Offen. (Patent) 2,105,680 (Aug. 24, 1972)
Chemical Abstracts 77, No. 26, 166275h (Dec. 25, 1972)

6.132 (6.19)

the autoclave involved heating the material to temperatures of from 96° to 132° C. and exposure of from 0-2 hr. All the test meals produced contained 82.5% to 85.0% protein (dry basis).

Short periods of heat treatment at about 125° C. appeared to stabilize the lipid phase against oxidation during storage of the meal. After 4 weeks such meals had a carbonyl number of 74-91 nmol CO/kg. fat, whereas the unheated reference meal had a carbonyl number of 323. The iodine number of the heated meals was about 120 g. I_2/100 g. fat (on the average) and of the unheated meal was 100 g. I_2/100 g. fat. The heat treatments caused a slight decrease in the amino-acid content of the meals. There was no correlation between the available lysine and the conditions of heat treatment, but there appeared to be a tendency for lysine availability values to decrease during prolonged heating of the herring material with increased moisture content.

During the heating treatments, the pepsin digestibility for the wet meals (about 40% moisture) dropped to about 33% with reference to the freeze-dried sample and for the dry meals (about 9% moisture) to about 66%. Pepsin digestibility values correlated well with values for nutritive criteria obtained in animal feeding tests.

[2 figures, 7 tables, 27 references]

FTP

4.86 FACTORS INFLUENCING SOFT LEATHER DRESSING

Holltein, M. [Hollstein ?] (Firma Zschimmer und Schwarz, Oberlahnstein, Germany)
Chemical Abstracts 78, No. 4, 17660y (Jan. 29, 1973)

6.132 FISH PROTEIN CONCENTRATE

Sharp, K. H. (pat.)
U.S. Patent 3,707,381
Food Technology 27, No. 4, 119 (Apr. 1973)

Ground fish are soaked in a weak aqueous formaldehyde solution and then dried. The product does not have the offensive odor of many fish meals.

FTP

4.86 LEATHER IMPREGNATION. I. FAT LIQUORING WITH SULFATE AND SULFITE OILS

Sofia, Alberto, Victor D. Vera, and Jorge Vergara (Cent. Invest. Tecnol. Cuero, La Plata, Argentina)
Chemical Abstracts 78, No. 6, 31431f (Feb. 12, 1973)

4.86 FATTY SUBSTANCES IN HIDE AND LEATHER. 10. INFLUENCES OF FATLIQUORING ON THE RECOVERY AND MECHANICAL PROPERTIES OF CHROME COLLAGEN FIBER FROM CHROME SPLIT LEATHER

Shirai, Kunio, and Hiroshi Okamura (Yamazaki Chem. Lab., Souk, Japan)
Chemical Abstracts 78, No. 6, 13435k (Feb. 12, 1973)

4.86 FATLIQUORING PROPERTIES OF ANION-ACTIVE LIQUORING OILS

Hollstein, M. (Zschimmerund Schwarz, Chem. Fabr., Lahnstein, Germany)
Chemical Abstracts 78, No. 4, 17656b (Jan. 29, 1973)

6.19 EFFECT OF VITAMIN D, DIETARY ENERGY ON LAYERS DISCUSSED

Anonymous
Feedstuffs 45, No. 19, 82, 84 (May 7, 1973)

During the 1973 Maryland Nutrition Conference held in Washington, D.C., M. L. Scott of Cornell University reported results of experiments to determine the effect of vitamin D on layer eggshell quality. Vitamin D was removed from the diet of laying hens. After the hens were depleted of vitamin D, they were fed the following diets, and the rate of return to normal egg production and eggshell quality was determined. The ration fed consisted of corn, soybean meal, 2.5% fish meal, 7.5% meat and bone scrap, 0.25% dried fish solubles, 1.25% dried whey, and 1.25% stabilized grease together with alfalfa meal, minerals, vitamins, and added methionine. The diet, without added vitamin D, was fed to 120 hens; the same diet with added vitamin D was fed to another group of 120 hens. All hens were at peak egg production at the beginning of the experiment. For 2½ months, egg production and shell quality were the same in both groups of hens. After this time, the diet was changed to an all-plant diet without fish meal and solubles, meat scrap, whey, and animal grease. Plant protein was substituted for animal protein. The vitamin D supplement was continued for the appropriate group. Egg production and shell quality remained unchanged for the next 40 days, and then egg production dropped precipitously in the group of hens on the vitamin D-free diet. At the same time, but lagging behind the drop in production, the breaking strength of the eggs declined from 3.5 kg. (average) to 2.7 kg. The major part of the drop occurred within the last 3-day period of the experiment. Of the hens considered to be free of vitamin

6.55 WOOD WASTE MATERIALS AS FEEDSTUFFS FOR RUMINANTS

Dinius, D. A. (Nutrition Institute, Ruminant Nutrition Laboratory, Agricultural Research Service, U.S. Dept. of Agriculture, Beltsville, Md.)
Feedstuffs 45, No. 14, 22 (Apr. 2, 1973)

This is a short review of some research studies reported in the literature on the use of sawdust, woodpulp, newsprint, office paper, and paperboard as feedstuffs for ruminants. Some pertinent data are shown in the following tables:

Feeding steers finishing rations containing sawdust

Item	Treatment		
	15% fine sawdust	15% coarse sawdust	15% ground timothy hay
Number of steers	6	6	6
Daily gain (lb.)	2.86	3.23	3.65
Feed/gain	7.23	6.95	6.36
Concentrate/gain	6.15	5.91	5.41
Dressing (%)	61.32	59.51	60.17

6.233 PREPARATION AND COMPOSITION OF THE LIVER EXTRACT FROM FISH LIVER RESIDUE--A BYPRODUCT OF FISH LIVER OIL INDUSTRY

Haq, S. A., Saleha Masood, and Razia Rafiq (Pakistan Council of Scientific and Industrial Research Laboratories, Karachi 39, Pakistan)
Science and Industry 9, Nos. 1-2, 67-71 (Jan.-Apr. 1972)

Papain digestion was more effective than pepsin-trypsin digestion or pressure cooking (15 lb. for 30 min.) for producing an extract from fish liver residue (material left after the extraction of oil). The enzyme digestions gave higher levels of B-complex vitamins in the final liver extract than did the pressure cooking method. The fish liver residue used was obtained from a fish liver oil factory; it represented the residue left over after the commercial extraction of oil. [1 table, 12 references] FTP

7.0 FOOD

Yeransian, James A., Katherine G. Sloman, and Arthur K. Foltz (General Foods Technical Center, White Plains, NY 10602)
Analytical Chemistry, Annual Review of Analytical Applications 45, No. 5, 77-112 (Apr. 1973)

This review of the field of food analysis covers the advances, innovations, and improvements which have appeared since the last survey was published in 1971 [Anal. Chem. 43, 70R (1971)]. The major subdivisions of food analyses included in the review are quantitative and qualitative procedures for: Additives; Adulteration, Contamination, and Decomposition; Carbohydrates; Color; Enzymes; Fats, Oils, and Fatty Acids; Flavors and Volatile Compounds; and Identity (covering information on the composition of genuine foods, such as butter as a stated ingredient in a food relative to fraudulent substitution).

In addition, the following subjects are reviewed: Inorganic (food constituents such as metal salts); Moisture; Organic Acids, such as malic, citric and oxalic acids in food products; Nitrogen, such as in protein, ammonia, and amino acids; and Vitamins. A Miscellaneous section is devoted to organizations on development of analytical methods, problems and progress in analytical methods for food toxicology including pesticides, and methods for classifying honey, and other procedures. A large bibliography is provided for each subject. SW

6.54 ECONOMICS, MARKETING, AND TECHNOLOGY OF FISH PROTEIN
(9.6)

Tannenbaum, Steven, and Bruce Stillings (editors)
Published by the MIT Press, Massachusetts Institute of Technology, Cambridge, MA 02142 (June 1973). Price $13.95 (estimated). [Number of pages not given.]
Food Technology 27, No. 5, 169 (May 1973)

This book contains a review of the present state of fish protein concentrates and assesses their future potential as a significant source of dietary protein. It contains review papers by experts on the extent of the fisheries resources, processing methods, nutritional evaluations, application in foods, economic aspects, and marketing. FTP

6.69 PROTEIN RECOVERY FROM THE FLUID DISCHARGED IN THE LEACHING OF KAMABOKO. I.

Kojima, Yoshio, Kinjiro Yamada, Yasumasa Oba, Masayuki Kochi, and Shoji Tagawa (Japan)
Chemical Abstracts 77, No. 10, 65999s (Sept. 4, 1972)

6.84 PREPARING A MOTHER-OF-PEARL PASTE FROM FISH SCALES

Kanevskii, M. U., I. A. Malyavina, M. S. Voskobolnikova, E. S. Tolchinskaya, L. D. Rozengauz, N. M. Dvorkina, M. V. Kalantarova, E. V. Nechaeva, T. I. Makarova, and R. G. Kamaletdinova (Moscow Plant of Theatrical Cosmetics) (pat.)
U.S.S.R. Patent 325,015 (Jan. 7, 1972)
Chemical Abstracts 76, No. 22, 131393x (May 29, 1972)

6.19

D, those showing reduced egg production were chosen for a study of vitamin D restoration. The average breaking strength of eggs from these birds was 1.7 kg. One group was fed the original diet with no vitamin D, and other groups were fed the diet with graded levels of vitamin D. All the groups returned to normal production in 2 weeks. The studies indicated that fish meal and solubles, meat scraps, whey, and animal grease contributed enough vitamin D to maintain normal egg production and egg quality. Hatchability of eggs from vitamin D-deficient hens was markedly lower than that of eggs from hens on a normal diet. SW

6.191 FISH CYTOLYSIS

Gattino, Jean, Albert Hurm, and Georges Lamotte (pat.)
French Patent 2,097,636 (Apr. 7, 1972)
Chemical Abstracts 78, No. 1, 3007d (Jan. 8, 1973)

6.55

Wood pulp as energy source for fattening steers

Item	Percent of woodpulp		
	0	50	70
Number of steers	6	9	9
Intake/day (lb.)	19.21	20.68	17.29
Gain/day (lb.)	3.85	3.17	2.99
Feed/gain	5.30	7.15	5.76

Newsprint as feedstuff for growing cattle

Item	Percent of newsprint			
	0	8	16	24
Number of steers	12	12	12	12
Avg. daily gain (lb.)	1.91	1.80	1.19	0.55
Avg. daily feed intake (lb.)	18.24	16.90	13.31	9.86
Feed/gain	9.48	9.39	11.20	17.63

[4 tables, 13 references] FTP

7.599 (9.19) TECHNIQUES FOR ANALYSIS OF PARAFFIN HYDROCARBONS AND FOR INTERPRETATION OF DATA TO ASSESS OIL SPILL EFFECTS IN AQUATIC ORGANISMS

Clark, Robert C., Jr., and John S. Finley (National Marine Fisheries Service, Northwest Fisheries Center, Environmental Conservation Division, Seattle, WA 98102)
Proceedings of Joint Conference on Prevention and Control of Oil Spills, 13-15 March 1973, American Petroleum Institute, Environmental Protection Agency, and U.S. Coast Guard, (1973), pp.161-172. Available from the American Petroleum Institute, 1801 K St., N.W., Washington, DC 20006. Price not given.

Normal paraffin hydrocarbons are one of the major groups of compounds in crude oil and petroleum products. Since these compounds can be readily separated from aquatic organisms using solvent extraction and liquid-solid chromatography and identified by gas-liquid chromatography, the normal paraffins can serve as indicators of petroleum pollution in the aquatic environment. It is necessary, however, to differentiate between natural (or biogenic) hydrocarbons and those assimilated by the organisms from pollution sources by comparing the natural hydrocarbon content and pattern (n-C14 to n-C37) of organisms from areas of pollution with those of organisms from relatively "unpolluted" areas.

The paper suggests techniques for obtaining and analyzing petroleum hydrocarbon data which can lead to a standard method for detecting and following the biological uptake of oil by living organisms from the aquatic environment. [4 figures, 4 tables, 15 references]

Abstractors: Robert C. Clark, Jr. and John S. Finley

8.51 AMINO ACID COMPOSITION OF THE FISH PROTEIN CONCENTRATE FROM CASPIAN SPRAT

Cheremin, Yu. A. (Astrakh. Med. Inst., Astrakhan, U.S.S.R.)
Chemical Abstracts 78, No. 1, 2896f (Jan. 8, 1973)

8.51 AMINO ACID COMPOSITION OF PEPTIDE CONCENTRATES

Sedykh, L. N., and O. V. Yurina (U.S.S.R.)
Chemical Abstracts 77, No. 11, 73817w (Sept. 11, 1972)

9. MAP PROJECTIONS FOR GEODESISTS, CARTOGRAPHERS AND GEOGRAPHERS

Richardus, Peter, and Ron K. Adler
American Elsevier Publishing Co., Inc., New York, N.Y, (1972), 174 pp. Price not given.

This book provides information on purposes and methods of projections, classification of map projections, datums and coordinate systems, and a summary of representation problems. In addition, general transformation formulae, theory of distortions, azimuthal and equidistant projections, and equivalent projections are described. The appendices cover a summary of mapping equations and constants used in mapmaking SW

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 7 PAGE 23

9.11 (9.1) MAN-MADE CHANGES IN THE EASTERN MEDITERRANEAN SEA AND THEIR EFFECT ON THE FISHERY RESOURCES

Ben-Tuvia, A. (Israel Oceanographic and Limnological Research Ltd., Haifa Laboratories, Haifa, Israel)
Marine Biology 19, No. 3, 197-203 (Apr. 1973)

The eastern area of the Mediterranean Sea was strongly influenced by two important changes: the completion of the Suez Canal in 1896, and completion of the Aswan High Dam on the Nile River in the year 1964. The Suez Canal, as an interconnecting waterway between the Red Sea and the Mediterranean, caused extensive changes in the fauna of the eastern area of the latter. Thirty species of Red Sea fishes can be found along the adjoining coasts of Israel and Lebanon: 21 are common, and 16 species are found regularly in commercial catches. Twenty-one percent of the Israel trawl catch and 8% of the inshore fishery is estimated to consist of Red Sea species.

The completion of the Aswan High Dam stopped the seasonal flooding of the Nile which had a strong effect on the marine environment in the delta region. When the flooding stopped the sardinella fishery along the Egyptian coast collapsed. Activity in this fishery occurred between August and December; the same period that the Nile floods discharged large volumes of mud and water, rich in nutrients, into the delta area. About 10,000 fishermen participated to produce a yearly catch that fluctuated between 10,000 and 20,000 tons. By 1966, the catch dwindled to 554 tons. The small sardinella fishery of Israel remained unchanged after the cessation of the Nile floods. The season for this fishery began in April and lasted to October. The average annual catch was about 1,350 tons.

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8.59 (1.53) POLYCYCLIC AROMATIC HYDROCARBONS IN HAKE LIVER AND TISSUE

Morgante, Anna (Ist. Merceol., Univ. Pescara, Pescara, Italy)
Chemical Abstracts 78, No. 3, 14602v (Jan. 22, 1973)

9.11 (9.1)

The cessation of the Nile floods also eliminated a fresh-water barrier between the North African coast and the entrance to the Suez Canal. An increasing westward dispersion of Red Sea species, emerging from the canal, to the North African coast was expected. Reports of occurrence of the species off Libya and Tunis in 1971 confirmed the prediction.
[1 table, 42 references] SW

7.612 FLUOROMETRIC DETERMINATION OF VITAMIN A IN FOODS

Erdman, John W., Jr., Shu-Hui F. Hour, and Paul A. Lachance (Dept. of Food Science, Rutgers University, New Brunswick, NJ 08903)
Journal of Food Science 38, No. 3, 447-449 (Mar.-Apr. 1973)

The colorimetric Carr-Price reaction, the official AOAC method for vitamin A analysis, may be insensitive and nonspecific, because some nonvitamin A compounds interfere with the colorimetric procedure. This paper describes a modification of the fluorometric method of J. N. Thompson, P. Erdody, R. Brien, and T. K. Murray [Biochem. Med. 5, 67 (1971)] for use in determining vitamin A in foods. The food samples are ground, saponified, homogenized, and then extracted with hexane for direct fluorometric measurement of vitamin A. The method has been applied to the assay of vitamin A in cereals, margarines, instant breakfast powders, pastry, cakes, and certain entrees (freeze-dried beef casserole).
[4 figures, 1 table, 17 references] FTP

9.1 HAWAIIAN REEF ANIMALS

Hobson, Edmund S., and E. H. Chave
University Press of Hawaii, Honolulu, Hawaii (1972), 135 pp. Price not given.

Eighty-six richly colored photographs of inhabitants of the reefs are presented in two broad categories: the fishes and the invertebrates. Representative fishes include the shark, moray eel, squirrel fishes, parrotfishes,, scorpionfishes, gobies, blennies, and others. The other category describes jellyfishes, corals, mollusks, crabs, sea urchins, and others. A short section on collecting describes how to clean out shells for display. Short comments on life history and habits of the animals are given. SW

9.1 (1.92) STRUCTURE OF THE PERCH POPULATIONS OF SOME PONDS IN FINLAND

Sumari, Olli
Annales Zoologici Fennici 8, 406-421 (1971) Helsinki, Finland

Rotenone was used to poison the fish in 32 small, oligotrophic [low in plant nutrients and rich in oxygen] ponds in Finland. The ponds were from about 1 acre to 130 acres in area. The numbers of perch and the biomass were determined. The perch estimated to be one, two, and three summers old were found to be 5.6, 9.5, and 12.4 cm. long., respectively. In one pond, all the perch were six summers old and of the same size. During the first few summers the growth rate of perch is the same as in larger waters, but later the growth rate decreases and may nearly cease. The author surmises that the growth rates correlate with food availability. The growth rate of older perch is high when young perch are available; it appears that the young are part of the food supply of the older fish.

The average biomass of perch was 11.9 kg. per hectare. The biomass of perch was smaller in ponds containing roach than in ponds without roach. The author concluded that the main factors affecting the perch populations are biotic, such as predation on young perch by perch, roach, pike, and burbot, and the availability of food.

[7 figures, 8 tables, 35 references] SW

9.12 (1.92) THE EGG DENSITY AND THE SURVIVAL OF EGGS ON THE SPAWNING GROUNDS OF THE VENDACE (COREGONUS ALBULA L.) IN LAKES PURUVESI AND OULUJÄRVI

Nissinen, Toivo
Tiedonantoja 1, No. 1, 1-114 (1972) Riista- Ja Kalatalouden Tutkimuslaitos Kalantutkimusosasto. Address: Librarian, Finnish Game and Fisheries Research Institute, Fisheries Div., Pitkänsillanranta 1A, 00530 Helsinki 53, Finland. (In Finnish, English summary)

Studies were conducted to determine the egg density and survival of the vendace in Lakes Puruvesi and Oulujärvi, Finland. At Lake Puruvesi, the age group 0+ was caught every other winter, and the age group 1+ was caught the following season in smaller numbers. Vendace of three growing-seasons old or older were taken in summer and during the spawning season. The vendace spawns for the first time at the age of 1+. The egg density at the spawning grounds varies from year to year from 9.5 to 21.2 eggs per square meter in good years. In poor years, when the spawning population is small, the egg density range is between 0.7 and 3.9 eggs per square meter.

At Lake Oulujärvi, the egg density in spring was between 5 to 6 eggs per square meter. The density in the autumn was 20 to 30 eggs per square meter in the best years, and 7 eggs per square meter in poor years. The author suggests that fluctuations of vendace population could be predicted by estimating egg density and survival. The survival rate for eggs in Lake Puruvesi in autumn and spring is about 35%; in Lake Oulujärvi it ranges between 20 and 30%.

9.14 (1.92) IMPACT OF FISH FEED MANAGEMENT AND PROCESSING ON PROFIT

Hastings, W. H. (Fish Farming Experimental Sta., Bureau of Sports Fisheries and Wildlife, Stuttgart, Ark.), and Bill A. Simco
Feedstuffs 45, No. 18, 33-34, 72 (Apr. 30, 1973)

The ideal feed is easily located by fish (in spite of heavy stocking density), has high acceptance, availability and conversion by fish, and is water stable. Processing feed to improve the physical quality can promote achieving these ideal characteristics. The standard conditions for making hard pellets are fine grinding, heavy steam conditioning before compression, and adequate drying after extrusion. One more step in the process can make a better pellet: conveying the pellets through a hot air dryer, similar to that used to make floating pellets, causes gelatinization of starch on the surface, a "case hardening," which results in improved water stability. The high temperatures associated with pellet making are destructive to several essential vitamins. Vitamin A, thiamine, and ascorbic acid are sensitive to oxidation during food processing. These vitamins are either protected by added antioxidants or, if lost, replaced by fortification of the formulae. Vitamin A is protected by encapsulation in microcrystalline wax compounds. An advantage of the process required for expanded pellets is that it reduces levels of residual pesticides.

Feeding experiments were conducted using various protein levels and different sources of protein. Feeds containing 30% protein were found to be most economical as indicated by cost analyses under the management conditions used. The Fish

9.15 REPORT OF THE SYMPOSIUM ON THE MAJOR COMMUNICABLE FISH DISEASES IN EUROPE AND THEIR CONTROL

Dill, William A. (editor)
EIFAC Technical Paper No. 17, European Inland Fisheries Advisory Commission, Food and Agriculture Organization, Via delle Terme di Caracalla, 00100, Rome, Italy (1972), 40 pp.

The Symposium was held April 20-22, 1972, in Amsterdam, Netherlands. The Symposium consisted of nine panels: eight panels discussed major fish diseases, and the ninth panel discussed control measures.

The volume and value of imports and exports in Europe of live fish and fish eggs are large. An example of one country's trade in these products is the Federal Republic of Germany (West Germany). In 1970, German imports of live fish were over 8,000 tons valued at $16 million. The fish are imported for (1) food, (2) brood stock for fish farms and hatcheries, (3) stocking natural waters and reservoirs, and (4) for use as bait fish and ornamental species. The following fish and fish eggs were listed in the trade: eels, Atlantic salmon, brown and sea trout, rainbow trout, huchen (Hucho hucho), chars (Salvelinus), white fishes (Coregonus), grayling (Thymallus thymallus), pike (Esox lucius), common carp, bream, crucian carp (Carassius carassius), goldfish (C. auratus), roach, tench, grass carp (Ctenopharyngodon idella), channel catfish, perch, and pike perch (Stizostedion lucioperca).

9.12 (1.92)

The vendace spawns on sloping beds composed of soft mud. The oxygen levels in the water and mud of the spawning grounds are maintained by slow currents in the lakes. The temperature of the water near the mud bottom of the Puruvesi spawning ground was found to be 2° C., while that of Oulujärvi was 1° C. and less. The author suggests that fishing for vendace in the 0+ age group should be regulated to ensure a sufficient spawning population to maintain the fishery.
[14 figures, 28 tables, 51 references] SW

9.15

The major diseases are distributed as follows. Viral hemorrhagic septicemia is confined to rainbow trout in Europe. Infectious pancreatic necrosis affects salmonids in the United States, France, Sweden, Italy, Scotland, and Japan. Infectious hematopoietic necrosis is a disease of young salmonids. Infectious dropsy of cyprinids occurs in all European countries with intensive carp culture. Swim bladder inflammation of cyprinids affects all age groups of wild and domestic carps in eastern Europe. Furunculosis affects all salmonids in salt and fresh-water and other fresh-water fish except in Australia and New Zealand. Ulcerative dermal necrosis affects salmonids and trout. Whirling disease occurs in Europe, Korea, North America, South Africa, and Colombia. It affects salmonid fishes. Descriptions were given of causative agents, symptoms, and transmission controls for all diseases.

The ninth panel agreed on the following points: (1) There is need for international control; (2) The most effective control method was inspection at the source; (3) Initially, international control should concentrate on traffic in the cultivable species and should include crayfish; (4) The major communicable fish diseases should be subject to international control measures; (5) The diseases require adequate methods for diagnosis; and (6) The international control system should be supported at the national level by inspections of hatcheries, reporting of epidemics, and certification of stocks, eggs, and establishments.

A list of participants and observers in the panels is given. SW

9.15 (1.8) INVERTEBRATE PATHOLOGY NONCOMMUNICABLE DISEASES

Sparks, Albert K. (National Marine Fisheries Service Gulf Coastal Fisheries Center, Galveston, TX 77550)
Academic Press, New York, N.Y. (1972), 387 pp. Price not given.

The subjects covered include the following: changes in cells following death; reaction to and repair of injuries; physical injury caused by changes in pressure or temperature; and chemical injuries caused by poisons, pesticides and detergents. Other subjects include injuries caused by venom or biotoxins and ionizing radiation. Tumors and tumorlike conditions are described in the last chaper. A bibliography is provided for each chapter, and there is an author and subject index. SW

9.14 (1.92)

Farming Experimental Station (FFES) standard test formula feed contains fish meal as a source of protein. Another source is poultry byproduct meal and delactosed whey. Growth has been as good as with previous FFES standard feeds. Results of supplementing feeds with lysine were erratic.

In experiments on population density and polyculture using catfish and hybrid buffalo fish the following data emerged. Unfed buffalo fish stocked in ponds at 135 per acre at harvest averaged 1,395 g. each. In feed provided ponds where catfish were stocked at 2,000 per acre and buffalo fish were stocked at 200 per acre, the latter were harvested weighing 1,110 g. each. Buffalo fish alone stocked at 1,000 per acre were harvested weighing 772 g. each. Low-density stocking is more productive per fish than high density stocking.
[3 figures, 9 tables] SW

9.14 RELATION BETWEEN THE TYPE OF NATURAL NUTRIENTS AND CHITINOLYTIC ACTIVITY IN THE DIGESTIVE TRACT OF SOME MARINE TELEOSTS

Colin, D. A. (Lab. Marit. Physiol., Inst. Michel Pacha, Tamaris-sur-Mer, France) Chemical Abstracts 78, No. 1, 2134f (Jan. 8, 1973)

9.15 CHITINOCLASTIC BACTERIA ASSOCIATED WITH SHELL DISEASE IN PENAEUS SHRIMP AND THE BLUE CRAB (CALLINECTES SAPIDUS)

Cook, David W., and Sandra R. Lofton (Gulf Coast Research Lab., Ocean Springs, MS 39564)
Journal of Wild Life Diseases 9, No. 2, 154-159 (Apr. 1973)

The presence of the infectious agent that causes shell disease or burned spot or rust disease in the lobster, blue crab, and king crab--commercially important species--is cause for concern in the fisheries. Chitinoclastic bacteria have been isolated from the lesions. These bacteria are ubiquitous in the marine environment and are part of the normal flora on marine crustaceans. The shell degradation in crabs was limited to the exocuticle and the calcified endocuticle. The bacteria do not penetrate into the soft tissue under the shell. The infected specimens overcame the disease by molting. The incidence of the disease is low in natural populations.

The incidence of the disease was investigated in several species of Penaeus shrimp collected from rearing ponds in Mississippi, Texas, Louisiana, and Florida; blue crabs and clams were also examined. When diseased portions on the shells were found, they were removed and streaked onto agar plates. Chitinoclastic bacteria were isolated from the shells and identified as Beneckea type I and Pseudomonas. Vibrio types I, II, and III and Beneckea were found on diseased clam shell. Beneckea type I is suspected of being the causative agent because it was found on diseased shells of all species examined.
[3 figures, 2 tables, 10 references] SW

9.16 (1.85) PROGRESS TOWARD FARMING SHRIMP IN THE UNITED STATES

Neal, Richard A. (National Marine Fisheries Service Gulf Coastal Fisheries Center, Galveston, TX 77550)
Marine Fisheries Review 35, Nos. 3-4, 67-70 (Mar.-Apr. 1973)

The strong demand and high prices paid for shrimp are incentives for development of farm raised shrimp. Several developmental farms are in operation seeking methods of economical shrimp aquaculture. In parts of southeast Asia and in Japan shrimp are farmed profitably. In the United States a rapidly accumulating store of knowledge on shrimp farming has emerged. Contributions have been made by researchers in State and Federal laboratories and in the universities. The emphasis in the studies has been on rearing shrimp at high densities which requires examining many factors. This approach makes the costs of rearing shrimp difficult to obtain. Pilot-scale operations by industry have developed cost data, but this information is considered propietary and not available. Using information that is available, shrimp can be raised to a length of 4 in. in a static pond, with no supplemental feed, at the rate of 100-150 lb. per acre. By fertilizing the pond, the yield can be increased another 100 lb. Continuous exchange of water will increase yield again, but the penalty of a polluting effluent will appear. The market value of 4-in. shrimp is low and growth of shrimp to lengths over 5 in. is slow. The slower growth to larger size increases the costs of the crop and reduces the return expected from larger shrimp. Mortality rates of shrimp in crowded conditions and for extended periods are a constant threat to profits. Survival in pond-rearing

9.17 SEACOAST PLANTS OF THE CAROLINAS FOR CONSERVATION AND BEAUTIFICATION

Graetz, Karl E. (Soil Conservation Service, U.S. Dept. of Agriculture)
Sea Grant Publication UNC-SG-73-06, University of North Carolina, Sea Grant Program, Chapel Hill, NC 27514 (Feb. 1973), 206 pp. Price not given.

Near the ocean, plant selection, use, and culture is drastically different from that in the interior. Coastal beach environment is hostile to plant life, and plants that have adapted themselves to seaside conditions through the years find establishment difficult. This bulletin contains the following sections: 1. The Beach Environment (Salt spray, The sand, Temperature, The wind); 2. Stilling the Sand with Grasses and Forbs (a herb that is not a grass); 3. Woody Plantings for Dune Protection; 4. Beach Landscaping; 5. Evaluation of Perennial Beach Plants; and 6. Plant Descriptions.
[Illustrated, 16 references] FTP

9.17 (9.16) ARE HATCHERIES AND SPAWNING CHANNELS ALTERNATIVES TO STREAM PROTECTION?

Narver, David W. (Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, British Columbia, Canada)
Circular No. 93, Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B.C., Canada (Mar. 1973), 11 pp. Price not given.

This paper was presented at the Truck Loggers Association Convention held in Vancouver, British Columbia, on Jan. 9-12, 1973. The author's objective was to show why hatcheries and spawning channels are not alternatives to stream protection measures. The author first discusses the concept of and the costs of stream protection and four aspects of the fishery resource base concerned. He concludes that hatcheries and spawning channels can play an important role in maintaining stocks of salmon and trout in the face of environmental change (such as dams), extremely intensive fisheries, and in those few situations where nature can be improved. But, the total fishery values associated with forested streams are large and are increasing, and these values can be degraded by logging. The direct and indirect costs to society are probably much less if stream protection measures are employed than if the stream is not protected and hatcheries and spawning channels are constructed to replace lost salmon and trout production. The author states that there are no alternatives to strict and rational stream protection measures.
[1 figure, 6 references] FTP

9.16 (1.85)

experiments from postlarval to 4-in. size has been 50% with a range of zero to nearly 100%. These mortalities are intolerable from an economic point of view.

Research is being directed toward problems in the following areas: (1) finding a dependable method for bringing female shrimp to maturity in captivity; (2) developing economical, nutritious feed; (3) developing the diagnosis, prevention, and treatment of shrimp diseases; and (4) developing a method for intensive culture of shrimp in closed systems. Profitable shrimp aquaculture in the United States is probably several years away; however, steady progress is being made toward that goal.

[1 figure, 5 photographs] SW

9.16 (0.8) SEA WATER SYSTEM FOR AQUACULTURE OF ESTUARINE ORGANISMS AT THE SKIDAWAY INSTITUTE OF OCEANOGRAPHY

White, David B., Robert R. Stickney, David Miller, and Lee H. Knight (Skidaway Institute of Oceanography, Skidaway Island, GA 31406)
Technical Report Series No. 73-1 Georgia Marine Science Center, University System of Georgia, P.O. Box 13687, Skidaway Island, GA 31406 (Jan. 1973), 18 pp. (Unpublished manuscript) Price not given.

This paper describes in detail the water system for aquaculture of estuarine organisms at the Skidaway Institute of Oceanography, and it includes a cost-accounting note. The report has been prepared in order to aid interested persons in the development of similar systems in areas with similar water quality problems. The sea-water system is capable of delivering over 100 gallons (380 liters) of clear sea water per minute. The system has several unique features for use in local estuarine waters.

The quality of the water must be controlled in any laboratory in which marine animals are cultured. The sea-water source for the Skidaway Institute contains considerable organic matter and clay particles. The system described is designed to handle such sea water.

[4 figures, 5 references, 1 appendix] FTP

9.19 (7.80) FLAVOR EVALUATION BY TRIANGLE AND HEDONIC SCALE TESTS OF FISH EXPOSED TO PULP MILL EFFLUENTS

Farmer, F. A., H. R. Neilson, and D. Esar (School of Food Science, McGill University, Montreal, Quebec, Canada)
Canadian Institute of Food Science and Technology Journal 6, No. 1, 12-16 (Jan.1973)

Flavor panel studies were used to detect flavor changes in fish resulting from exposure of the fish to various pulpmill effluents and to effluents treated to remove odor and taste. By means of triangle taste tests for flavor, the evaporator condensate, digester effluent, and recovery furnace flue gas condensate from the kraft mill were identified as the sources causing flavor tainting in fish exposed to them. Removal of the flue gas condensate to 1% of total mill effluent improved the flavor of the fish as judged by the hedonic scale test. Removal of the evaporator condensate down to 1% of total mill effluent caused no improvement in fish flavor. Fish exposed to effluent treated with activated sludge and turbulent contact absorber plus a stay in an aerated lagoon were less objectionable than fish exposed to untreated effluents. The effective effluent treatments in increasing order of value were turbulent contact absorber, activated sludge, and a stay in an aerated lagoon.

[3 tables, 9 references] SW

9.19 (9.6) INTRODUCTION TO MARINE ENVIRONMENTS

Zottoli, Robert (Dept. of Biology, Fitchburg State College, Fitchburg, Mass.)
C. V. Mosby Co. (publisher), St. Louis, Mo. (1973), 125 pp., 95 illustrations. Price not given.

This textbook is designed for advanced high school students and college students. The introduction deals with the ecology, reproduction, growth, and survival of marine life. The section on "Abiotic and Biotic Factors" covers chemical and physical factors, food habits, and productivity of the sea. The section on "Habitats and Inhabiting Organisms," covers the forms of life found in tidal pools, beaches, estuaries, bottoms, and rocky intertidal zones.

Each chapter contains a list of references cited, and there is a 10-page list of selected references subdivided by chapter. A subject index is included. Most of the chapters have field exercises which are adaptable to fresh-water environments. SW

9.19 (7.9) TRENDS IN METHODOLOGY FOR EVALUATION OF EFFECTS OF POLLUTANTS ON MARINE ORGANISMS AND ECOSYSTEMS

Waldichuk, Michael (Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia, Canada)
Critical Reviews in Environmental Control 3, No. 2, 167-211 (Feb. 1973)

This review covers developments in the techniques and general methodology used in studies of the marine environment, of aquatic organisms, and of the marine ecosystem as related to pollution and other manmade changes. The author emphasizes the total system approach in ecology involving the disciplines of marine biology at all trophic levels, the various aspects of physical and chemical oceanography, and mathematical modeling. Laboratory studies of tolerance of organisms to pollutants now consider responses to sublethal doses. Adverse physiological and behavioral responses of organisms to pollutants exist at levels as much as three orders of magnitude lower than the lethal threshold.
[2 figures, 3 tables, 378 references] FTP

9.19 (1.92) GEOTHERMAL MERCURY POLLUTION IN NEW ZEALAND

Weissberg, B. G., and M. G. R. Zobel
Bulletin of Environmental Contamination and Toxicology 9, No. 3, 148-155 (Mar. 1973)

Many mercury ore deposits are directly associated with active hot springs or have mineral structures and textures that indicate they were deposited from currently inactive hot spring systems. A close relationship between mercury ore concentrations and hot springs is widely accepted; however, most hot spring waters contain very low concentrations of mercury--0.01 to 2 μg. per kilogram of water. Inorganic mercury discharged from these sources may accumulate in the sediments of rivers or lakes. After microbial methylation of inorganic mercury and transport into the water, methylmercury may become concentrated in the edible tissue of fish.

Experiments were performed to find the relation of mercury in the sediments to that in fish. Rainbow and brown trout, and sediments from the Waikato River and lakes (North Island, New Zealand) were analyzed for total mercury using a method of flameless atomic absorption. Gas chromatography tests specific for methylmercury performed on about one-half of the trout samples indicated that all the mercury present was in this form. Sediment samples were obtained from cores from water depths up to 33 m.

The results indicate that trout living in waters receiving geothermal discharges had much higher concentrations of mercury than fish in waters receiving little or no thermal discharges. Mercury concentrations in fish in waters receiving mercury-containing industrial effluents were higher than in fish in waters receiving geothermal discharges. Mercury concentrations in sediment and sedimentary

9.19 (7.42) MERCURY: SHORT TERM STORAGE OF NATURAL WATERS

Carr, Roderick A., and Peter E. Wilkniss (U.S. Naval Research Laboratory, Washington, DC 20390)
Environmental Science & Technology 7, No. 1, 62-63 (Jan. 1973)

Samples of mercury-containing natural waters may require short-term storage before being analyzed. Other workers have found that under storage conditions mercury may be transferred from the water to the container walls, particulates, and to vapor. To minimize losses in storage, other workers used oxidants and acids, which were also used to prepare the samples for quantitative analysis. The authors developed a sensitive method for determining mercury content using carrier-free labeled Hg^{197} and an improved flameless atomic absorption technique.

The authors based their method on the simultaneous radio tracer, cold vapor reduction-aeration measurements with the tracer added carrier-free, leaving the system at essentially the natural concentration (1-100 ng./l.). In their study, they took samples from Chesapeake Bay with a typical estuarine water salinity of 5‰ and 7 mg./l. suspended solids. Carrier-free Hg^{197} was added to two 1-liter and two 19-liter samples and stored for 8 days in polyethylene containers. One of each pair was acidified to a pH of 1 with redistilled nitric acid. Initially, the mercury in the acidified sample was in a solid state, but it gradually became soluble. Purging of an aliquot at 96 hr., using conditions previously developed for flameless atomic absorption, showed quantitative removal of the tracer. After 8 days, whole bottle counting indicated 0.7% of the tracer had adhered to the container.

9.19 CHLORINATED HYDROCARBON PESTICIDES AND RELATED COMPOUNDS IN ADIPOSE TISSUE FROM PEOPLE OF JAPAN

Curley, A., V. W. Burse, R. W. Jennings, and E. C. Villanueva (U.S. Environmental Protection Agency, Chamblee Toxicology Laboratory, 4770 Buford Highway, Chamblee, GA 30341), L. Tomatis, and K. Akazaki
Nature 242, No. 5396, 338-340 (Mar. 30, 1973)

Persistent, chlorinated hydrocarbon pesticides are regularly found in ecosystems and in adipose tissue of people. Polychlorinated biphenyls (PCBs) are persistent compounds used in manufacturing processes. PCBs are also found in the environment and are reported to be in human tissue. To determine the presence of these compounds in people of Japan, 241 adipose tissue samples from Japanese autopsies were analyzed. Twenty-five random samples of tissue were analyzed for PCBs after separation of DDT-like compounds. Techniques of chromatography were used in the analyses.

Preliminary results of the tests show that DDT, dieldrin, and heptachlor epoxide levels were within the range found in human adipose tissue in the United States. Levels of isomers of hexachlorocyclohexanes were high compared to levels found in the United States. All 25 samples analyzed for PCBs were positive; a concentration of less than 1.00 p.p.m. in 80% of the samples was found.
[4 figures, 2 tables, 13 references] SW

9.19

The nonacidified sample remained in a solid state throughout storage. Acidification and immediate purging at 8 and 96 hr. removed only 10% of the tracer. Whole bottle counting at 8 days indicated 15.3% of the tracer was associated with the container--a serious loss.

A meaningful analysis for total mercury cannot be obtained by flameless atomic absorption techniques if the major part of the element is in the solid state. Storage of the samples for 8 days at pH < 1 allows total mercury to be properly determined.

Although it is expected that mercury would associate with the large surface area available in the turbid bay water, surprisingly almost quantitative association of mercury with particulates is found in clean glacial meltwater. A frozen sample obtained from a depth of 57 meters at Camp Century, Greenland, showed that the mercury is almost quantitatively associated with filterable solids, but is released into solution during storage at a pH < 1.

[2 figures, 8 references]

Mary Ellen Engett

9.19 LEAD IN SOILS AND PLANTS: A LITERATURE REVIEW

Zimdahl, Robert L., and Jon H. Arvik (Dept. of Botany and Plant Pathology, Colorado State University, Fort Collins, CO 80521)
Critical Reviews in Environmental Control 3, No. 2, 213-224 (Feb. 1973)

Lead (Pb) occurs in the environment naturally; its distribution is altered by the activities of man. Native lead occurs in insoluble forms as sulfides, oxides, and carbonates. The earth's crust contains on the average about 16 p.p.m. of lead. This review covers the literature relative to the behavior of lead in soils and plants.

The addition of lead to the soil from atmospheric fallout increases the average level only imperceptibly. The movement of lead in the soil is limited due to the sorptive ability of the soil. Plants take up lead slowly through their roots, and plant foliage may absorb lead. The lead taken up by the roots from the soil generally remains in the roots. The lead from the atmospheric contamination of plants usually remains as a topical coating of particles on the foilage. The present levels of lead associated with crops are not sufficient to pose a hazard to humans or animals.

[129 references]

FTP

9.19 EFFECTS OF ELEMENTAL PHOSPHORUS ON MARINE LIFE

Jangaard, P. M. (compiler and editor)
Circular No. 2, Atlantic Regional Office, Research & Development, Fisheries Research Board of Canada, Halifax, Nova Scotia, Canada (Nov. 1972), 313 pp. Price not given.

During the winter and spring of 1969 large numbers of dead and dying fish were found in Placentia Bay, Newfoundland, coinciding with the opening of a local phosphorus plant. The reports presented in this volume describe the results of the investigations that followed leading the way for the eventual coexistence of a major industry and a fishery. The 28 reports represent original manuscripts or reprints of articles published in various scientific journals. The contents are divided into six sections as follows: (1) The Phosphorus Pollution Crisis. Chronology and Summary (5 reports), (2) Behavior of Elemental Phosphorus as a Pollutant (6 reports), (3) Toxicity of Elemental Phosphorus to Marine Life. Bioassays (6 reports), (4) Histology and Hematology (3 reports), (5) Chemical Studies. Analytical Methods (5 reports), and (6) Analytical Results (3 reports).

FTP

9.19 (1.92)

rocks ranged from about 0.1 to 0.5 mg. per kg. of sediment. Concentrations of mercury in trout ranged up to 0.2 mg. per kg. of tissue. The authors wish to emphasize the narrow margin between background concentrations of mercury in the environment and the higher mercury level in sediments that are affected by geothermal discharges. This environmental pollution may cause the mercury concentrations in trout to exceed 0.5 mg. per kg. of fish, the maximum concentration acceptable for human consumption.

[2 figures, 2 tables, 14 references]

SW

9.19 THE ENVIRONMENTAL FATE OF STRANDED CRUDE OIL

Blumer, M. (Woods Hole Oceanographic Institution, Woods Hole, MA 02543), M. Ehrhardt, and J. H. Jones
Deep-Sea Research 20, No. 3, 239-259 (Mar. 1973)

The magnitude of oil production and transportation by tanker since World War II has been associated with increasing oil pollution of the shores, coastal waters, and open ocean. Qualitative information on the immediate and long-term ecological effects of spilled oil is lacking. The persistence of oil pollutants determines the amount of accumulation, and consequently, the total impact on marine organisms.

Over a period of time, the petroleum or petroleum products in the marine environment undergo 'weathering,' which is an alteration of the material by several processes: evaporation, dissolution, microbial degradation, and chemical degradation. The relative importance of these processes is controlled by environmental conditions such as temperature. However, chemical degradation of petroleum becomes evident only at an advanced stage of weathering, the final products resembling asphalt. The products resulting after completion of each of these processes can be subjected to gas chromatography for identification.

The fate of two spills of crude oil which stranded on the coasts of Martha's Vinyard, Mass., in 1970 and Bermuda, 1970, was studied during 13½ months and 16 months, respectively. The findings show that the lower boiling point components were evaporated within a few months of the spill. Compounds containing 23 carbons or more were not affected by evaporation. Microbial degradation was active in the presence of decaying seaweed and other nutrients available on the rocks. In the

9.19 MECHANISMS OF TRACE METAL TRANSPORT IN RIVERS

Gibbs, Ronald J. (Dept. of Geological Sciences, Northwestern University, Evanston, IL 60201)
Science 180, No. 4081, 71-73 (Apr. 6, 1973)

Understanding the fate of trace metals that pollution superimposes on the environment requires knowledge of their mechanisms of transport in rivers and their chemical cycles in nature. Trace metals may be found in the following states in the rivers: (1) dissolved or adsorbed on solids readily available for reaction with other substances; (2) in organic compounds or metallic hydroxides--chemical changes are required to make them available; and (3) in the crystal structures of suspended materials--nearly unavailable in nature.

Experiments were performed to determine the amounts of iron, nickel, copper, chromium, cobalt, and manganese transported by rivers. Samples of water and suspended sediments were obtained from the Amazon and Yukon Rivers well upstream of the ocean and away from sources of pollution. The samples were treated by extraction, reduction, dialysis, oxidation, or fluxed as required to free the metal ions from complexes.

The results of the investigation indicate that the distribution of trace metals in both rivers was similar. In addition, copper and chromium were combined in crystalline solids. Manganese was found in coatings on particles, and iron, nickel, and cobalt were distributed equally between precipitated metallic coatings on particles and crystalline solids.

[1 figure, 1 table, 13 references] SW

9.19 INTERAGENCY INVESTIGATIONS OF A PERSISTENT OIL SPILL ON THE WASHINGTON COAST. ANIMAL POPULATION STUDIES, HYDROCARBON UPTAKE BY MARINE ORGANISMS, AND ALGAE RESPONSE FOLLOWING THE GROUNDING OF THE TROOPSHIP GENERAL M. C. MEIGS

Clark, Robert C., Jr., and John S. Finley (National Marine Fisheries Service, Seattle, WA 98112), Benjamin G. Patten (National Marine Fisheries Service, Mukilteo, Wash.), Dennis F. Stefani (Environmental Protection Agency, Region X, Seattle, Wash.), and Edward E. DeNike (Washington State Dept. of Ecology, Olympia, Wash.)
Proceedings of Joint Conference on Prevention and Control of Oil Spills, 13-15 March 1973, American Petroleum Institute, Environmental Protection Agency, and U.S. Coast Guard (1973), pp. 793-808. Price not given.

An interagency team of biologists, chemists, oceanographers and engineers has been investigating the long-term effects of oil spilled by the grounding of the troopship General M. C. Meigs January 6, 1972, on an ocean coast intertidal community of plants and animals. Oil has continuously been released from the 440,000 liters of Navy Special Fuel Oil carried by the vessel. The team assessed biological damage by making (1) surveys of abundance and physiological condition of animals, (2) qualitative evaluation of obvious damage to plants, and (3) measurements of the hydrocarbon uptake in both plants and animals. A series of sites, forming a vertical profile of the rocky shelf area from the upper intertidal zone to the lowest low tide level in Wreck Cove, has been studied.

9.19 USE OF "WHOLE EGG RESIDUES" IN PESTICIDE/EGGSHELL STUDIES

Lakhani, K. H. (Natural Environment Research Council, The Nature Conservancy, 19-20 Belgrave Square, London SW1, England)
Nature 242, No. 5396, 340-341 (Mar. 30, 1973)

In a previous contribution, W. Hazeltine [Nature 239, 410 (1972)] argued against a proposal by L. J. Blus, C. D. Gish, A. A. Belisle, and R. M. Prouty [Nature 235, 376 (1972)]. These investigators suggested that a concentration-effect relation existed between DDE in eggs and shell thickness. The author states that Blus and his associates refuted Hazeltine's argument. The author advances another argument against Hazeltine's view that whole egg residues are valueless in pesticide-eggshell thickness studies of incubated eggs because the residues are metabolized during incubation. The author points out that Hazeltine gave no data for residues based on whole egg basis and gave no acceptable evidence to show metabolism of DDE. In addition, use of whole egg residues for these studies would provide a conservative test if the correlation between eggshell thickness and levels of residue is asserted to be negative. The author suggests that the work of Blus and associates has satisfied this condition.

[3 references] SW

9.19

This report describes the preliminary findings of the first ten months (January-October, 1972) of the investigation. Abnormal and dead urchins (Strongylocentrotus purpuratus) indicated that this species was affected. Loss of fronds and bleached thalli not evident in control areas were observed in the plant community in the immediate vicinity of the hulk. Petroleum hydrocarbons were taken up in the intertidal community. The normal paraffin hydrocarbon patterns and content over the range n-$C_{14}H_{30}$ to n-$C_{37}H_{76}$ of healthy-appearing goose barnacles (Mitella polymerus), crabs (Hemigrapsus nudus) and an alga (Fucus gardneri) display the same basic characteristics as the fuel oil which had been lost from the General M. C. Meigs.
[12 figures, 5 tables, 18 references]
Abstractors: Robert C. Clark, Jr., John S. Finley, Benjamin G. Patten, Dennis F. Stefani, and Edward E. DeNike

9.19 DDE IN EGGS AND EMBRYOS OF BROWN PELICANS

Nisbet, I. C. T. (Massachusetts Audubon Society, Lincoln, MA 01773)
Nature 242, No. 5396, 341-342 (Mar. 30, 1973)

In a previous report, W. Hazeltine [Nature 239, 410 (1972)] argued against the association of eggshell thinning with p,p'-DDE, which has been reported by several other workers. His argument asserts that the developing embryo metabolizes DDE residues. The author argues that Hazeltine's data did not demonstrate the metabolism of DDE; furthermore, since thinner shelled eggs containing higher levels of DDT are broken more frequently, the eggs in Hazeltine's samples had larger than average shell thickness. Hazeltine also mistakenly correlated positively shell thickness with DDE concentration in the lipids of the yolk. The author argues that this correlation is inappropriate because during incubation lipids are reduced by metabolism thus DDE levels appear to increase. The author stated that Hazeltine's statistics relating shell thickness to whole egg residue of DDE are not significant. Finally, the author states that the thinning of birds' egg shells caused by ingested p,p'-DDE is one of the best known of environmental phenomena. He therefore finds it odd that Hazeltine, with evidence based on a sample too small and homogeneous, should question the validity of the phenomenon.
[22 references] SW

9.19

absence of nutrients, no microbial degradation occurred in a 16-month period. The process of dissolution was slow, especially on higher boiling-point compounds. After 16 months at Bermuda and 13½ months at Martha's Vinyard, there was little chemical degradation of the crude oil.

The authors concluded that the spilled oil is very persistent; and weathering may be more rapid on the beaches than in the open ocean. Paraffin-rich wax inclusions were found in the oil stranded on Bermuda. These precipitate from paraffinic crude oils during shipment in tankers. The authors suggest that the presence of these 'tar balls' in the open ocean may provide direct evidence that they originated from tank cleaning operations and provide an indicator of the need for control measures.
[5 figures, 6 tables, 11 references] SW

9.19 OCEANIC OBSERVATION OF NEW YORK BIGHT BY ERTS-1
(7.9)

Charnell, Robert L., and George A. Maul (National Oceanic and Atmospheric Administration, Atlantic Oceanograhic and Meteorological Laboratories, Physical Oceanography Laboratory, Miami, Fla.)
Nature 242, No. 5398, 451-452 (Apr. 13, 1973)

During August 1972, the multispectral scanner (MSS) aboard the first Earth Resources Technology Satellite obtained images of New York Bight that indicated variations of water quality. The results demonstrate the effectiveness of the use of satellite in observing surface features of oceanic significance. The MSS measures reflectance of solar energy in four channels having band pass filters that cover the visible and near infrared bands from 0.5 to 1.1 μm. The solar energy penetrates ocean water deeper for the shorter observed wavelengths; thus, features characteristic of the water mass (turbidity, for example) are more predominant in the lower bands. The article contains one illustration of the bulk process imagery of the New York Bight showing the oceanic features indicative of the disposal of various wastes. The authors suggest that satellites with sensors optimized to view the ocean in visible and infrared wavelengths, supplying synoptic data over large areas, will materially aid management of the coastal zone on a broad scale.
[2 figures, 1 reference] FTP

9.19 ORGANIC MERCURY COMPOUNDS IN COASTAL WATERS

Fitzgerald, W. F., and W. B. Lyons (Marine Sciences Institute and Dept. of Geology, University of Connecticut, Groton, CT 06340)
Nature 242, No. 5398, 452-453 (Apr. 13, 1973)

The role of mercury and its eventual fate in the fresh-water and marine environment will depend upon the chemical and physical form that mercury exists in the environment. This article gives data on the total and inorganic content in the coastal waters and adjacent river waters of Long Island Sound. The analyses were carried out on two sets of samples of the natural waters. The first set was analyzed directly giving the amount of inorganic mercury in the water. The second set was analyzed after it had been allowed to photo-oxidize to destroy the dissolved organic carbon present. Analysis of this second photo-oxidized set of samples gave the total amount of mercury present. The amount of mercury associated with organic matter was considered the total mercury value minus the inorganic mercury value. The mercury was analyzed by a modification of the standard flameless atomic absorption technique.

The levels of inorganic, organically associated, and total mercury in Long Island Sound waters are shown in the table that follows. Earlier published work has shown that the amount of mercury in sea water ranged from 0.003 to 0.364 μg. $liter^{-1}$. The present data are within this broad range of mercury levels, but, in addition, seem to indicate that much of the mercury exists in the organically

(over)

9.2 ORGANIZING AND OPERATING A FISHERY COOPERATIVE. PART 1 AND PART 2

Smith, Frederick J. (Marine Economics, Oregon State University)
Sea Grant No. 19, Part 1, 4 pp. and No. 19a, Part 2, 43 pp. Oregon State University, Extension Marine Advisory Program, Corvallis, OR 97331. Prices not given.

A fishery cooperative consists of a group of fishermen acting together for mutual benefit. It is created to help resolve an economic need such as to stabilize income from season to season, to improve quality control, to reduce cost of fishing supplies and equipment, or to establish a competitive market for fish products. The cooperative may perform one or more functions; for example, transport fish products to processors or markets, operate fishing vessel service stations, operate vessel repair shops, market members' fishery products, arrange for financing, or operate seafood processing plants.

To organize and operate a fishery cooperative successfully, knowledge and understanding of cooperative management and marketing is required. These publications give information on organization, management, and legal aspects of fishery cooperative organization and operation. Part 1 provides an overview of cooperative organization and operation. Part 2 provides information on cooperative by-laws and agreements and on State and Federal regulations. The sections of part 2 are: Considerations in Preparing By-Laws; An Outline for Preparing By-Laws; Sample By-Laws; Sample Marketing Agreements; and Federal Fishery Cooperative Regulations.

FTP

9.19 METHYLMERCURY: BACTERIAL DEGRADATION IN LAKE SEDIMENTS

Spangler, William J., James L. Spigarelli, Joseph M. Rose, and Hope M. Miller (Midwest Research Institute, Kansas City, MO 64110)
Science 180, No. 4082, 192-193 (Apr. 13, 1973)

The presence of methylmercury in lake sediments has been attributed to bacterial methylation of inorganic mercury (Hg^{2+}). The authors state that, although this process is generally accepted, most workers have been unable to find even trace amounts of methylmercury in a variety of naturally occurring sediments or water. An investigation was undertaken to determine the cause of inability to find methylmercury in sediments.

Sediments were taken from the delta area of the St. Clair River, Mich. The sediments were mixed with water in a ratio of 150 g. (wet weight) to 100 ml. water; the mixture was prepared in a flask and 2 mg. of labeled mercuric chloride was added. The flask was incubated for 146 days without shaking, and it was flushed with a continuous stream of sterile air. A trap containing a solution of KBr and $HgBr_2$ was attached to the flask to collect any volatile mercury species in the effluent air. During the first 50 days of incubation, concentrations of methylmercury increased from zero to 0.31 μg./g. The electron-capture gas chromatography method was used in the determinations. As the incubation continued there was a rapid decrease in the amount of methylmercury and a simultaneously rapid increase in mercury vapor (Hg°) collected in the trap. Furthermore, no methylmercury was found in the trap at this time. To determine if microbial degradation caused the loss of methylmercury, an inoculum from the contents of the flask was inserted into

9.2 (9.3) SPHERES OF INFLUENCE IN HAWAII'S COASTAL ZONE. VOLUME 1. FEDERAL AGENCY INVOLVEMENT

Rutka, Justin, and Chennat Gopalakrishnan (University of Hawaii)
Sea Grant Advisory Report, UNIHI-SEAGRANT-AR-72-03, University of Hawaii, Honolulu, Hawaii (Mar. 1973), ix + 89 pp. Price not given.

This report is the first of a two-volume series intended to serve as focal points for the coordinated planning efforts of Hawaii's coastal zone. This volume 1 outlines the general issues of coastal resource management and provides an overview of federal agency programs in Hawaii's coastal environment. The various facets of state and county involvements will be discussed in the second volume to be published at a later date.
[5 figures, 3 tables, 62 references, appendix]

FTP

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tryptic soy broth containing labeled methylmercury bromide. After 170 hr. of incubation, the methylmercury had disappeared and the mercury appeared as Hg vapor. Four bacterial isolates obtained from the mixed culture transformed methylmercury to methane and mercury vapor. The isolates were short gram-negative rods and appeared to be Pseudomonas spp.

These results indicate that demethylating organisms inhabit mercury-containing sediments and could be responsible for degradation of some of the methylmercury present.

[3 figures, 9 references] SW

9.19

associated form. There appears to be regional differences in mercury levels in the coastal marine environment (earlier work showed mercury concentrations of British coastal waters of from 0.011 to 0.021 $\mu g./1.^{-1}$). However, uncertainties exist about the types and amounts of the various forms of mercury present in the marine waters and the fractions being measured. Therefore, more information is required on the distribution of the chemical forms of mercury in natural waters in order to elucidate the pathways and interactions of mercury in the estuarine and marine environment.

Location of Long Island Sound water sample	Date collected (year 1972)	Salinity of the water	Mercury concentration		
			Total	Inorganic	Organically associated
		‰	$\mu g./1.^{-1}$	$\mu g./1.^{-1}$	$\mu g./1.^{-1}$
Connecticut River	Aug. 21	0.09	0.045	0.021	0.024
Avery Point Dock	Sept. 26	29.7	0.067	0.025	0.042
Fishers Island Sound	Aug. 17	30.1	0.078	0.028	0.050
Race, Long Island Sound	Oct. 13	30.3	0.047	0.033	0.014

[2 tables, 18 references] FTP

9.3 THE CONTINENTAL SHELF REDEFINITION, WITH SPECIAL REFERENCE TO THE ARCTIC

Pharand, Donat (Civil Law Section, University of Ottawa, Canada)
McGill Law Journal 18, No. 4, 536-559 (Dec. 1972)

The present discussions in the United Nations Sea-Bed Committee relative to a redefinition of the continental shelf take on special importance when the proposals are applied to the Arctic area; the Arctic has the largest continental shelves in the world. This article is a review of the meaning of the present definition of the continental shelf and a discussion of the main proposals for a redefinition in light of their application to the Arctic. The contents consist of:

I. The Present Definition of the Continental Shelf,
   a. The Notion of 'Natural Extension,'
   b. The Factor of 'Adjacency,'
   c. The Criterion of 'Exploitability.'
II. Redefinition of the Continental Shelf,
   a. U.N. Sea-Bed Activities,
   b. The U.S. Draft Convention,
   c. Urgency and Perspectives of a Redefinition.

[80 footnotes] FTP

9.2 FUNDAMENTALS OF BIOSTATISTICS

Vann, Edwin (Wayne State University)
Published by D. C. Heath and Company, Boston, Mass. (1972), 184 pp. Price not given.

This book covers the basic field of biostatistical technique for the biologist who does not have a background in mathematics, has not been exposed to the field, but has a working knowledge of college algebra. The author believes that most of the problems likely to be presented to a biologist are represented in one form or another in this book. The author warns that a well-planned experiment providing readily analyzable data is a tremendous asset and is of equal importance to the biostatistical technique. SW

9.3 NATIONAL-INTERNATIONAL JURISDICTIONAL BOUNDARY ON THE OCEAN FLOOR

Hedberg, Hollis D. (Law of the Sea Institute, University of Rhode Island, R.I.)
Occasional Paper No. 16, Law of the Sea Institute, University of Rhode Island, Kingston, RI 02881 (1972). Price not given.

This paper deals with the problem of jurisdiction over the ocean bottoms (the ocean floor and the resources on and below it) but does not consider jurisdiction over the ocean waters (the rights to navigation, fishing, etc., and the doctrine of freedom of the seas). The decision as to where the boundary between national and international jurisdiction of the ocean floor lies is now critical and urgent. This paper presents for consideration a basis for such a boundary and offers a procedure for its practical application worldwide.

The author recommends that the most natural, most equitable, and most practicably acceptable form of national-international jurisdictional boundary would consist of points fixed by geodetic coordinates of latitude and longitude connected by straight lines or arcs, lying within a zone of internationally agreed width extending oceanward from the approximate base of the continental shelf or insular slopes adjacent to the shores of coastal nations or their dependencies. The base of the continental or insular slope is the critical dividing line between that part of the ocean floor pertaining to the land areas of the world and the nations, and that part of the ocean floor which properly belongs to the ocean domain and could appropriately be placed under international jurisdiction. He further recommends that an International Marine Boundary Commission be created

9.3 ISSUES ARISING IN THE ICELANDIC FISHERIES CASE

Katz, Stephen R. (University of Wales Institute of Science and Technology)
International and Comparative Law Quarterly 22, Part 1, 83-108 (Jan. 1973)

On April 14, 1973, the British Government filed an application with the International Court of Justice asking the Court to decide

> (a) that there is no foundation in international law for the claim by Iceland to be entitled to extend its fisheries jurisdiction by establishing a zone of exclusive fisheries jurisdiction extending to fifty nautical miles from the baselines hereinbefore referred to; and that its claim is therefor invalid; and
> (b) that questions concerning the conservation of fish stocks in the waters around Iceland are not susceptible in international law to regulation by the unilateral extension by Iceland of its exclusive fisheries jurisdiction to fifty nautical miles from the aforesaid baselines but are matters that may be regulated, as between Iceland and the United Kingdom, by arrangements agreed between those two countries . . . [which] give effect to the continuing rights and interests of both of them in the fisheries of the waters in question.

The present paper is a discussion of some of the important issues that are expected to face the Court.
[83 footnotes]

FTP

9.3 (9.19) AIR POLLUTION ABATEMENT: AN EXAMINATION OF THREE POLICIES

Ferrar, T. A. (Dept. of Economics, Pennsylvania State University, University Park, PA 16802)
Critical Reviews in Environmental Control 3, No. 2, 121-128 (Feb. 1973)

Three economic policies for inducing control of environmental pollution are discussed. These consist of the (linear) effluent charge policy, the property right allocation or direct discharge restriction system, and a combination of the two policies.
[4 figures, 5 references]

FTP

9.3 POLITICAL COBWEBS BENEATH THE SEA

Stang, David P. (Washington, D.C.)
International Lawyer 7, No. 1, 1-15 (Jan. 1973)

About 2 years ago, the United Nations General Assembly charged (by resolution) the U.N. Seabed Committee to serve as the preparatory body for a 1973 Law of the Sea Conference. The U.S. Seabed Committee was delegated the responsibility for preparing a list of subjects and issues that should be dealt with by the Conference and to prepare draft articles for a future treaty. In this paper the author examines the results of the four sessions of the Seabed Committee during the past 2 years. The only major tangible results of the past 2 years' work of the Committee, according to the author, are two documents agreed upon at the Committee's summer 1972 session. The first document is a list of subjects and issues which should be dealt with by the Conference. The second contains draft texts of seabed principles which would be incorporated into a future draft treaty. The working group agreed that any draft text that contained language that was not necessarily acceptable would be included in brackets; thus, most of the language of the draft principles is bracketed.

Although the summer 1972 session represented a major step in the attitudinal approach of delegates to negotiations, there apparently was no consensus near on most of the major issues. The major unresolved issues of the two stated documents are:

1. Limits of the territorial sea and navigational rights of vessels and aircraft, in and over international straits that are within the territorial sea of coastal states.
2. Limits of coastal state jurisdiction over resources of the seabed adjacent to and beyond the territorial sea; also, the nature and limitations of coastal

9.3 INDICES OF NATIONAL INTEREST IN THE OCEANS

Alexander, Lewis M. (Law of the Sea Institute, University of Rhode Island, Kingston, R.I.)
Ocean Development and International Law Journal 1, No. 1, 21-49 (Spring 1973)

Each of the 148 independent States of the world has an interest in the oceans and is presumably in a position to affect, and be affected by, developments relating to jurisdiction and control in the marine environment. These interests, too, are reflected in policies regarding the international Law of the Sea. By analyzing the nature of the national marine interests a generalized model can be applied to any one of the countries and the States can be divided into groupings related to their physical, economic, historic, or other characteristics with respect to the marine environment. The basic components of the national marine interest are accessibility, investment, dependence, and control. The author believes that these components are important to an understanding of the positions of the 30 landlocked, 20 shelf-locked, and 98 other countries in the current and upcoming Law of the Sea negotiations.

Considerable useful information is presented in seven tables having the following titles: Division of States According to the Nature of Adjacent Shelves; Areas of Seabed Acquired by States Beyond the 200-Meter Isobath Through the Extension of National Jurisdictional Limits to the Outer Edge of the Continental Margin; Areas of Seabed Acquired by States Beyond the 200-Meter Isobath Through the Extension of National Jurisdictional Limits to a Distance of 200 Nautical Miles From the Coast; Rank Order of States Acquiring the Largest Area of Seabed Beyond the 200-Meter Isobath Through the Adoption of New National Jurisdictional Limits; Strategic International Straits; Breadths of the Territorial Sea and Exclusive Fisheries Claims; and States Which Have Ratified, Acceded to, or Consider Themselves Bound to the Geneva Conventions on the Law of the Sea. [28 footnotes, 7 tables] FTP

9.3

state jurisdictional authority in such areas.

3. The nature of the fishing rights that coastal nations may obtain in high seas areas adjacent to their coasts,....

4. The measures that coastal nations may take in high seas areas adjacent to their coasts to protect themselves against marine pollution caused by foreign countries or their nationals,....

5. The measures that coastal nations may take in high seas areas adjacent to their coasts to regulate the conduct of foreign nationals of scientific research on the high seas and underlying seabed,....

6. The rights of individual nations and their nationals to explore and exploit the national resources of the seabed beyond the limits of national jurisdiction,....

It appears that the major objectives of most of the coastal countries of the world are to: (1) Extend seawardly the limits of their exclusive jurisdiction and control over fisheries, exploration and exploitation of minerals of the seabed, and scientific research conducted by foreign vessels in areas adjacent to their coasts and in other parts of the high seas; (2) minimize restrictions on their exercise of such jurisdication; and (3) establish an international organization that they would control.

The objective of the developed nations appear to be to preserve the largest possible area of the high seas, and within that area retain with mineral restrictions the rights to exercise high seas freedoms (particularly the freedom to navigate, fish, and conduct scientific research on the high seas, and to retain this high seas freedom subject only to reasonable international regulation; to mine the minerals of the ocean floor beyond the limits of coastal nation jurisdiction). [9 footnotes] FTP

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under the aegis of the United Nations to designate worldwide an approximate position for a base-of-slope line for this purpose, and that the United Nations decide on the width of the zone oceanward from this line within which the International Boundary Line should lie. Each coastal nation then could designate its own exact boundary within this zone which, subject to the certification of the International Marine Boundary Commission that it was within the agreed zone, would then be presented to the United Nations for ratification.

A draft copy of an atlas of some hundred bathymetric maps is in preparation to accompany this paper. These drafts will have drawn on them tentative base-of-slope lines and alternative boundary zones of 100, 200, and 300 km. width, respectively, oceanward from the base-of-slope lines. The atlas is being prepared only to give a rough appraisal of the feasibility of drawing the base-of-slope lines and to show the effects of boundary zones of different widths. Pending completion of the atlas, the present paper contains eight reduced-size samples of the original 16 in. by 20 in. atlas sheets.
[2 figures, 8 references, 15 attachments] FTP

9.3 WORLD FISHERIES POLICY: MULTIDISCIPLINARY VIEWS
(9.6)

Rothschild, Brian J. (editor) (National Marine Fisheries Service, NOAA, La Jolla, Calif.)
University of Washington Press, Seattle, WA 98105 (1972), xix + 272 pp. Price $9.50.

This book is the fourth volume of a series called "Public Policy Issues in Resource Management." Volume IV is a collection of papers presented at seminars held in 1970-71 at the University of Washington. The subjects cover a wide array of issues. Some of the highlights are several chapters on the legal aspects of international fisheries. These cover disputes, world laws to prevent disputes, and agreements toward management of multinational fisheries. Other chapters are given to discussions of the current and future policies of the United States regarding international fishing arrangements. Fisheries management objectives as such are described in chapters that cover the activities of underdeveloped countries. The critical limitations of the sea as a source of food in relation to population are considered in a chapter which also contains suggestions for maintaining the fisheries. Each chapter concludes with a bibliography, and the book has an index.

The other four volumes in this series are: "The Fisheries: Problems in Resource Management," edited by James A. Crutchfield; "Water Resources Management and Public Policy," edited by Thomas H. Campbell and Robert O. Sylvester; "Weather Modification: Science and Public Policy," edited by Robert G. Fleagle; and "Ocean Resources and Public Policy," edited by T. Saunders English. SW

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(8.7)

THE CODEX ALIMENTARIUS COMMISSION UNDER INTERNATIONAL LAW

Shubber, Sami (Baghdad University, Baghdad, India)
International and Comparative Law Quarterly 21, No. 4, 631-655 (Oct. 1972)

The Codex Alimentarius Commission, an international organ, arose through the cooperative actions in the food standards field between the World Health Organization (WHO) and the Food and Agriculture Organization (FAO). The Commission is one of two organs under the Joint FAO/WHO Food Standards Program (the other organ is the Executive Committee). This article discusses the powers of the Codex Alimentarius Commission. These are: (1) Formulation of proposals for and advice to the Director-Generals of WHO and FAO, on matters pertaining to the implementation of the Joint FAO/WHO Food Standards Program, (2) The establishment of subsidiary bodies, (3) The preparation of food standards, (4) Publication of food standards, and (5) The coordination of work on food standards. In addition, the article considers the legal nature of codex standards. The membership of the Commission now stands at 93 member States. The work of the Codex Alimentarius Commission may lead to the creation of a mature system of food standards, including national food legislations based on such standards, with the objectives of protecting the health of the consumer and the reduction of barriers and discrimination in the food trade. [100 footnotes]
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9.3

THE SURGE OF SEA LAW

Wurfel, Seymour W. (Law School University of North Carolina)
Sea Grant Publication UNC-SG-73-01, Sea Grant Program, School of Public Health, University of North Carolina, Chapel Hill, NC 27514 (Mar. 1973), 247 pp. Price not given.

These 27 law-of-the-sea papers were prepared in 1972 by students of International Law at the School of Law of the University of North Carolina. The papers are published in this single volume to make readily available a representative condensation of current thinking, practices, and aspirations in the law of the sea.

Seymour W. Wurfel, "Introduction," p. i;
Page Dees, "A Brief Historical Survey of Freedom of the Seas," p. 1;
Jack W. Abel, "Crisis in the South Pacific: Tunaboat Seizures," p. 18;
Lynn Allison, "Jurisdiction in National Waters," p. 29;
Douglas M. Martin, "The Blockade "Exception" to Territorial Water Jurisdiction," p. 43;
William E. Rabil, Jr., "The Antarctic Treaty: A Stepping Stone to the Development of an International Seabed Regime," p. 51;
Thomas R. Suher, "Toward an Agreement on the External Delimitation of the Territorial Sea," p. 59;
A. Wilder Wadford, Jr., "The Attitude of Developing Countries Toward International Agreements on Environmental Control of the Ocean," p. 68;
Albert M. Neal, Jr., "The International Seabed Regime: Proposals and Prospects for Realization," p. 75;
Bryan W. Pittman, "The Marine Environment and Toxic Substances," p. 82;

9.3

FREEDOM OF PASSAGE THROUGH INTERNATIONAL STRAITS: COMMUNITY INTEREST AMID PRESENT CONTROVERSY

De Rocher, Frederic G.
Sea Grant Technical Bulletin No. 23, University of Miami, Coral Gables, FL 33149 (Nov. 1972), 129 pp. Price $3.00.

The problem of passage rights through international straits is potentially one of the most critical and devisive issues for the forthcoming Conference on the Law of the Sea. In this thesis the author attempts to (1) identify the current facts which give rise to the issue, (2) identify the claims advanced relative to international straits by the international community and by the coastal states, (3) trace the manner in which the problems of passage through international straits have arisen, and (4) offer some criteria that may characterize an internationally acceptable solution to the problem of passage through international straits and outline a basis for accommodating conflicting interests.

The author suggests that the apparent paramount coastal state concern is the legitimate desire to be secure from adverse impact on its environment--a threat which is more intense within international straits. A first step toward optimum solution of the straits passage issue is the demonstration by the international community of some real concern for the danger to coastal states by the present lack of effective concern for maritime safety. Some effective multilateral regulation in the form of an international shipping convention is necessary. Further, coastal states should renounce any ambitions for either monetary or ideological toll gates across international straits; the legitimate interest at stake is purely

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HOW 'SEA GRANT PROGRAM' ASSISTS U.S. FISHERIES

Abel, Robert B. (National Sea Grant Program, NOAA, Rockville, MD 20852)
Fishing News International 12, No. 3, 29-32, 33 (Mar. 1973)

The Sea Grant Program was established by a congressional act in October 1966 after national goals regarding marine resources were developed by concerned people in the fields of education, government, and industry. The purpose of the program is (1) to make use of the marine resources in the offshore waters of the United States (These resources include animal and vegetable life and minerals.); (2) to develop skilled manpower and equipment necessary to use the resources; and (3) to promote economic opportunities in the use of these resources. Initially, implementation of the program was assigned to the National Science Foundation. In 1970, the Sea Grant Program was transferred to the newly created National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce. Sea Grant is an independent office which reports directly to the NOAA administrator.

In 1971, the Secretary of Commerce officially designated the first Sea Grant colleges. They were Texas A & M and the Universities of Washington, Rhode Island, and Oregon State. Two more were announced in 1972: the Universities of Wisconsin and Hawaii. The Sea Grant activities of these schools emphasize three functions: research and development, education and training, and advisory services.

Of the activities in the schools, Sea Grants support the following projects. The University of Washington will attempt a total systems analysis of the North Pacific fisheries. The Univ. of Rhode Island will develop a systems model for monitoring Narragansett Bay using an integrated approach. The marine advisory

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Geoffrey Alan Planer, "The Disposal of Radioactive Wastes into the Sea: Some International Legal Considerations," p. 98;
John Pendergrass, "The Law of Maritime Oil Spills," p. 108;
Keith Hennessee, "Legal Action To Curb Pollution of the Sea," p. 119;
Bill Raney, "International Conservation of Marine Mammals," p. 129;
John M. Geil, "Offshore Oil Drilling: A Comparison of State Laws," p. 138;
Robert L. Mullinax, "International Protection of Marine Life From the Effects of Pollution Due to Land-Related Activities," p. 147;
Anderson Haynes, "Attitudes of Distant Fishing Nations to the Conservation of Fishery Resources," p. 155;
Paul Carruth, Jr., "African Attitudes Toward the Law of the Sea," p. 166;
Noel Allen, "Cooperation Between Canada and the United States of America in the Conservation of the Living Resources of the Seas," p. 178;
George Wood, "Colombia's View of Maritime Legal Problems," p. 191;
W. Vance Brown, II, "French Law and the Policy Toward Pollution in the Mediterranean," p. 198;
Michael A. Jacobs, "Israel's View of Her Maritime Legal Problem," p. 204;
C. Edward Alexander, "The Japanese Legal Approach to Marine Pollution," p. 209;
James Hugenschmidt, "The People's Republic of China's View of Contemporary Maritime Legal Problems," p. 214;
Elmo Zumwalt III, "Primary Elements Influencing the Development of the Legal Regime of Soviet Territorial Waters," p. 223;
R. L. Moore, "The Application of the Jones Act to Foreign Seamen and Foreign Flag Operations," p. 230;
John Morgan, "Actions for Personal Injury and Wrongful Death in Maritime Surroundings," p. 236.

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service program of Oregon State is considered to be a model for the Nation, and it has concentrated on helping the Northwest fishing industry, from fishermen to processors. Texas A & M has developed, with industrial and local governmental cooperation, the first commercial shrimp ponds in the state. The Univ. of Wisconsin has been treating problems of the Great Lakes and the ocean with the aid of existing competence. The Univ. of Hawaii program has concentrated on the needs and opportunities of the Hawaiian Islands and U.S. Trust Territories; they also have a program of human performance in the sea.

The advantages of the Sea Grant Program lie in the stability of funding on which competent investigators may rely, and continuing projects may be accomplished.
[5 photographs]

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9.4 COMMERCIAL OPERATORS 1972

Anonymous
State of Alaska, Dept. of Fish and Game Statistical Leaflet No. 24, (1972), 16 pp., Juneau, Alaska. Price not given.

This booklet contains lists of Alaskan commercial fisheries processors who operated in 1972, with mail addresses, plant locations, and products they marketed. The lists are in three parts: Part I gives salmon (including eggs) processors, part II gives shellfish processors, and part III gives miscellaneous fish processors. These include processors of black and ling cod, fresh and frozen; halibut, fresh and frozen; herring, cured, salted, frozen, bait, and eggs; red snapper, fresh,frozen; steelhead and smelt, frozen.

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9.3 PACEM IN MARIBUS
[PEACE IN THE OCEANS]

(Various volumes as listed below)
Royal University of Malta Press, Malta (1971). Prices not given.

A series of documents have been issued related to and dealing with the Pacem in Maribus Convocation (An International Convocation to Explore Peaceful Uses of the Oceans and the Ocean Floor) held in Malta on June 28 through July 3, 1970. These include the following volumes:

"Quiet Enjoyment: Arms Control and Police Forces for the Ocean" (Proceedings of the Preparatory Conference on Arms Control and Disarmanent, Jan. 1970), edited by Elizabeth Young and Lord Ritchie-Calder of Balmashannar, Vol. 1, 198 pp.

"Legal Foundations of the Ocean Regime" (Proceedings of the Preparatory Conference on the Continental Shelf and Legal Framework, Jan.-Feb. 1970), Vol. 2, 242 pp.

"Planning and Development in the Oceans" (Proceedings of the Preparatory Conference on Planning and Development, Feb. 1970), Vol. 3, 170 pp.

"Ocean Enterprises" (A Special Report on a Preliminary Conference held in Preparation for the Pacem in Maribus Convocation at Valletta, Malta, June 28-July 3, 1970), edited by Elaine H. Burnell and Piers von Simson, Vol. 4, 170 pp.

"The Ocean Environment" (Proceedings of the Preparatory Conference on Ecology and the Role of Science, Apr. 1970), Vol. 5, 268 pp.

"Selected Bibliography," compiled by Wolfgang Vitzthum, Vol. 6, 44 pp.

"Proceedings Pacem in Maribus Convocation, Malta, June 28-July 3, 1970," Vol. 7, 116 pp.

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one of physical integrity of the coastal state. Also, the definition of innocent passage should make clear with respect to commercial traffic that (a) within the territorial sea, activities prejudicial to recognized legitimate coastal state interests may be prohibited and (b) commercial passage is innocent as long as it does not unreasonably threaten the physical environment of the coastal state.

For commercial purposes then, the critical elements of innocence are adherence to a multilateral Shipping Convention, the upgrading of maritime safety generally, and the adherence to multilaterally-determined routings for vessels presenting special environmental hazards.
[242 footnotes]

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2.3 PURIFICATION OF WASTE WATERS FROM FOOD-INDUSTRY PLANTS

Lorents, V. I. (Budivel'nik, Kiev, Ukr., U.S.S.R.)
Chemical Abstracts 78, No. 8, 47542d (Feb. 26, 1973)

9.6 MICROBIOLOGY OF FOODS AND FOOD PROCESSING
(2.01)(2.05)

Nickerson, John T., and Anthony J. Sinskey (Dept. of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass.)
American Elsevier Publishing Co., Inc., New York, N.Y. (1972), 306 pp. Price $12.50.

This book contains information that will be of interest to those involved in food manufacturing, food catering, and preparation and serving of foods in restaurants and institutions. Microbiological examination of foods using various techniques is covered in the first chapter. Individual chapters describe the microbiology of dried food, meat and eggs, fruits and vegetables, and dairy products. Preservation by heating, freezing, and by chemical means are covered in three chapters. Foodborne infections and intoxications are discussed in two chapters, and the last chapter deals with sanitation in food-manufacturing plants, and in food preparation and serving establishments. Each chapter has references and the book has an index. SW

3.3 FOOD CANNING TECHNIQUES
(9.6)
Gutterson, M.
Food Processing Review 26, vii + 238 pp. (1972). Published by Noyes Data Corp., Park Ridge, N.J. Price $36.00.
Food Science and Technology Abstracts 4, No. 12, 12E458, p. 23 (Dec. 1972)

This book on commercial food canning techniques is based on relevant patents dating back to 1963. The information can be used as a guide to U.S. Patent literature in this field and is arranged under the following topics: "General" (canning systems, aseptic canning, closure techniques, can coatings, deoxygenation, containers, chemical preservatives), pp. 3-60; "Meat and Poultry," pp. 61-110; "Fish and Sea-Food," pp. 111-146; "Vegetables, Fruits, and Juices," pp. 147-183; "Dairy Products," pp. 184-205; "Beverages," pp. 206-214; "Cereals," pp. 215-223; and "Miscellaneous Product" (coffee, eggs, aerosols), pp. 224-233. The table of contents is arranged to serve as a subject index. Company, inventor, and patent number indexes are shown. SW

9.7 COMPUTER-BASED ABSTRACT SERVICE NOW AVAILABLE

Stewart, George F. (Dept. of Food Science and Technology, University of California, Davis, CA 95616), and Calvert L. Willey (Institute of Food Technologists, 221 N. LaSalle St., Chicago, IL 60601)
Food Technology 27, No. 5, 31, 35-36 (May 1973)

Abstracts of papers and of food patents are put on tapes for generating indexes and for printing Food Science and Technology Abstracts (FSTA). FSTA is an abstract journal covering over 1,000 journals and is published by the International Food Information Service (IFIS). IFIS is under the direction of the Institute of Food Technologists, the Commonwealth Agriculture Bureaux (England), Institut für Dokumentationswesen (Germany), Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Netherlands), and Zentrastelle für Maschinelle Dokumentation (Germany). IFIS is now producing searchable tapes of FSTA for use by the Institute of Food Technologists in the United States and Canada, and for the other agencies in IFIS. The computer tapes contain all the information published in FSTA, and they have been edited and their format designed to search out and print out selected abstracts. Also, selective print-outs of abstracts covering standard subject matter categories can be provided.

Two information centers for this service are the North Carolina Science and Technology Research Center, P.O. Box 12235, Research Triangle Park, NC 27709 and Computer Search Center, Illinois Institute of Technology Research Institute, 10 West 35th St., Chicago, IL 60616. Information on the availability and costs of the services may be obtained by writing to one of these centers. FTP

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